DOCUMENT RESUME

ED 288 722 SE 048 734

AUTHOR	Spector, Barbara S., Ed.
TITLE	A Guide to Inservice Science Teacher Education: Research into Practice. 1986 AETS Yearbook.
INSTITUTION	Association for the Education of Teachers in Science.; Ohio State Univ., Columbus, Ohio. Information Reference Center for Science, Mathematics, and Environmental Education.
PUB DATE	Jan 87
NOTE	173p.
AVAILABLE FROM	SMEAC Information Reference Center (SMEAC/IRC), The Ohio State University, 1200 Chambers Road, 3rd Floor, Columbus, OH 43212 ($7.50).
PUB TYPE	Reports - Descriptive (141) -- Information Analyses (070)
EDRS PRICE	MF01/PC07 Plus Postage.
DESCRIPTORS	Continuing Education; *Elementary School Science; Elementary Secondary Education; Guidelines; *Inservice Teacher Education; Instructional Improvement; Models; Professional Associations; Science Education; Science Instruction; *Science Teachers; *Secondary School Science; Staff Development; *Theory Practice Relationship

ABSTRACT

Designed to assist science educators in improving inservice teacher education, this yearbook contains resources and ideas addressing the application of recent research into a format suitable for practitioners. The eight chapters comprising the document deal with: (1) meeting the needs of science teachers for continuing education; (2) guidelines for effective science teacher inservice (including perspectives from research); (3) assessing teachers' needs for inservice; (4) a paradigm for staff development planning; (5) structures for the delivery of inservice program models; (6) the evaluation of staff development (with an emphasis on staff development becoming a process rather than an event); (7) a planner's guide to inservice; and (8) a response to the entire document. Examples of inservice needs assessments, time inservice plans, and checklists are provided. (TW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED288722

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it

☐ Minor changes have been made to improve reproduction quality

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Robert H. Howe
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

1986 AETS Yearbook

A GUIDE TO INSERVICE SCIENCE TEACHER EDUCATION: RESEARCH INTO PRACTICE

Edited by

Barbara S. Spector
University of South Florida
College of Education
Tampa, FL 33620

Association for the Education of
Teachers in Science

and

SMEAC Information Reference Center
The Ohio State University
1200 Chambers Road, Room 310
Columbus, OH 43212

January 1987

SE 048 734

BEST COPY AVAILABLE

Table of Contents

Foreword i

Contributing Chapter Authors ii

Acknowledgements iii

Chapter 1 - Overview: Meeting the Needs of Science Teachers for Continuing Education
Barbara S. Spector 1

Chapter 2 - Guidelines for Effective Science Teacher Inservice Education Programs: Perspectives from Research
Thomas P. Evans 13

Chapter 3 - Assessing Teachers' Needs for Inservice
David R. Stronck 57

Chapter 4 - A Paradigm for Staff Development Planning
Donald C. Orlich 73

Chapter 5 - Structures for Delivery of Inservice Program Models
Margaret B. Heimbuck-Petersen 95

Chapter 6 - The Evaluation of Staff Development: A Process, Not an Event
William C. Kyle, Jr. and Maria A. Sedotti 101

Chapter 7 - A Planner's Guide to Inservice
Barbara S. Spector 119

Chapter 8 - Response to the "Guide to In-Service Science Teacher Education: Research into Practice"
Emma Walton 137

Foreword

The SMEAC Information Reference Center is pleased to continue cooperating with the Association for the Education of Teachers in Science in producing these Yearbooks.

We invite your comments and suggestions on this series.

Stanley L. Helgeson
Patricia E. Blosser

SMEAC Information Reference Center

Contributing Chapter Authors
(Alphabetical Order)

THOMAS P. EVANS
Oregon State University
Department of Science,
Mathematics, and Computer
Science Education
Corvallis, OR 97331

MARGARET B. HEIMBUCK-PETERSEN
Dade-Monroe Teacher Education Center
Dade County Public Schools
Miami, FL 33516

WILLIAM C. KYLE
Purdue University
School Mathematics and
Science Center
Education Building
West Lafayette, IN 47907

DONALD C. ORLICH
Washington State University
Department of Educational
Administration and Supervision
Pullman, WA 99164

MARIA A. SEDOTTI
University of Connecticut
Department of Curriculum and Instruction
Storrs, CT 06268

BARBARA S. SPECTOR
University of South Florida
College of Education
Tampa, FL 33620

DAVID R. STRONCK
California State University, Hayward
Department of Teacher Education
Hayward, CA 94542

EMMA WALTON
Anchorage School District
Science Education
Anchorage, AK 99508

Acknowledgements

Thank you to all those who collaborated in the development of this Yearbook including: Dr. Thomas Evans, who in his term as President, selected the topic for this yearbook and asked me to edit it; the authors who shared in conceptualizing the content; the National Science Supervisors Association's leadership who, sharing our concern for the lifelong learning of science teachers, reviewed and critiqued the manuscript in its formative stages and provided the chapter written by Dr. Emma Walton suggesting ways that science supervisors might use the research and strategy in this manuscript; Ms. Margaret Heimbuck-Petersen who provided extensive technical assistance in preparing this manuscript; and the ERIC/SMEAC staff for editing and publishing the Yearbook.

Chapter 1

OVERVIEW: MEETING THE NEEDS OF SCIENCE TEACHERS FOR CONTINUING EDUCATION

Barbara S. Spector

Background

A major portion of the federal government's money for science education from 1976 through 1982 was devoted to research which revealed a need to alter the quality and quantity of science taught K-12 in this country. It was reported that our existing education was leading to scientific and technological illiteracy for an overwhelming number of U.S. citizens (Harms & Kahl, 1981). Fourteen-year-old American students ranked 15th out of students from 19 countries in overall science knowledge. Only 16% of the nation's high school students took a chemistry course. The youth of our nation declared an increasing disinterest in studying science in school while they indicated an increasing interest in learning science outside of school (NAEP, 1982). Clearly, there was a critical need to change the direction and goals of American precollege science.

The existence of a crisis in precollege science and its impact on society was acknowledged by the general public in 1982 when the media reported the alarming research findings presented at the May, 1982 National Academy of Sciences Convocation in Washington, D.C., addressing science education. Research had documented an urgent need to alter what was being taught as science in schools, the way it was taught, and the shortage of persons qualified to teach it appropriately. There was no doubt that there was a crisis in science education.

National leaders in government, business/industry, and the scientific community expounded the need for a scientific and technologically literate citizenry. They said that the future of our nation's economy, our defense, and the quality of life for all citizens was tied to success in educating this nation's young people in science and technology.

Many individuals from widely varied segments of our population and groups with diversified (education and non-education) missions turned their attention to science education and assumed responsibility for making changes. A rash of initiatives was triggered to mitigate the crisis. The majority of the initiatives focused on those who teach science in precollege institutions.

The dramatic shortage of teachers who were qualified to teach science effectively at the elementary, middle/junior high school, or high school level became a national focus. Legislators, representatives from business/industry, parents, and professionals at all levels of the educational establishment responded with suggestions for post baccalaureate education to increase teachers' abilities to teach science. Providing education to existing teachers of science in order to update their knowledge of science and enable them to alter what science was taught K-12 and the way it was taught, plus training teachers certified in non-science disciplines to teach science classes seemed to be viewed as the panacea for the crisis.

The assumption appeared to be that providing teachers with post-baccalaureate education would cause change in teachers' behaviors which would result in improvement in the science precollege students learned. Teachers were quick to point out that for education to effect a change in teachers' behaviors and subsequent school improvement, there needed to be concomitant changes in available facilities, equipment, materials, and most crucial of all, time.

Presently, the federal government, many states, and local school districts are earmarking significant dollars for the postbaccalaureate education of people who teach science. Initiatives supported include graduate degree programs, non-degree college courses, school district inservice credit courses useable for state certification and recertification, conferences, organizational development interventions, and other non-credit experiences (see figure 1-1).

There is a trend in this nation to blur the lines of demarcation among units in universities and among institutions concerned with science education. Some federal and state funding sources are requiring that interfaces be developed among units in universities and between higher education institutions and K-12 school districts across which there must be extensive collaboration. In some instances collaboration with informal education agencies, business/industry, and/or the community at large is required to obtain funding. Consequently, it is appropriate, and even necessary, to address inservice science teacher education as a continuum with formal university graduate degree programs at one end, school district inservice credit courses in the middle, and non-credit initiatives on the other end.

In this document, all post-baccalaureate education initiatives for science teachers come under the umbrella label of inservice science teacher education. Where an author's comments are unique to one specific dimension of the total inservice continuum, it is noted in that chapter.

It is useful to distinguish among the labels of program, initiative, and activity. Inservice programs are composed of various initiatives, each of which consists of one or more activities. For example, a school district's program might be composed of a variety of initiatives from which teachers might elect to attend a one-day workshop on stress management, a two-week summer institute on current topics in biology, or a classroom exchange site visit series. During

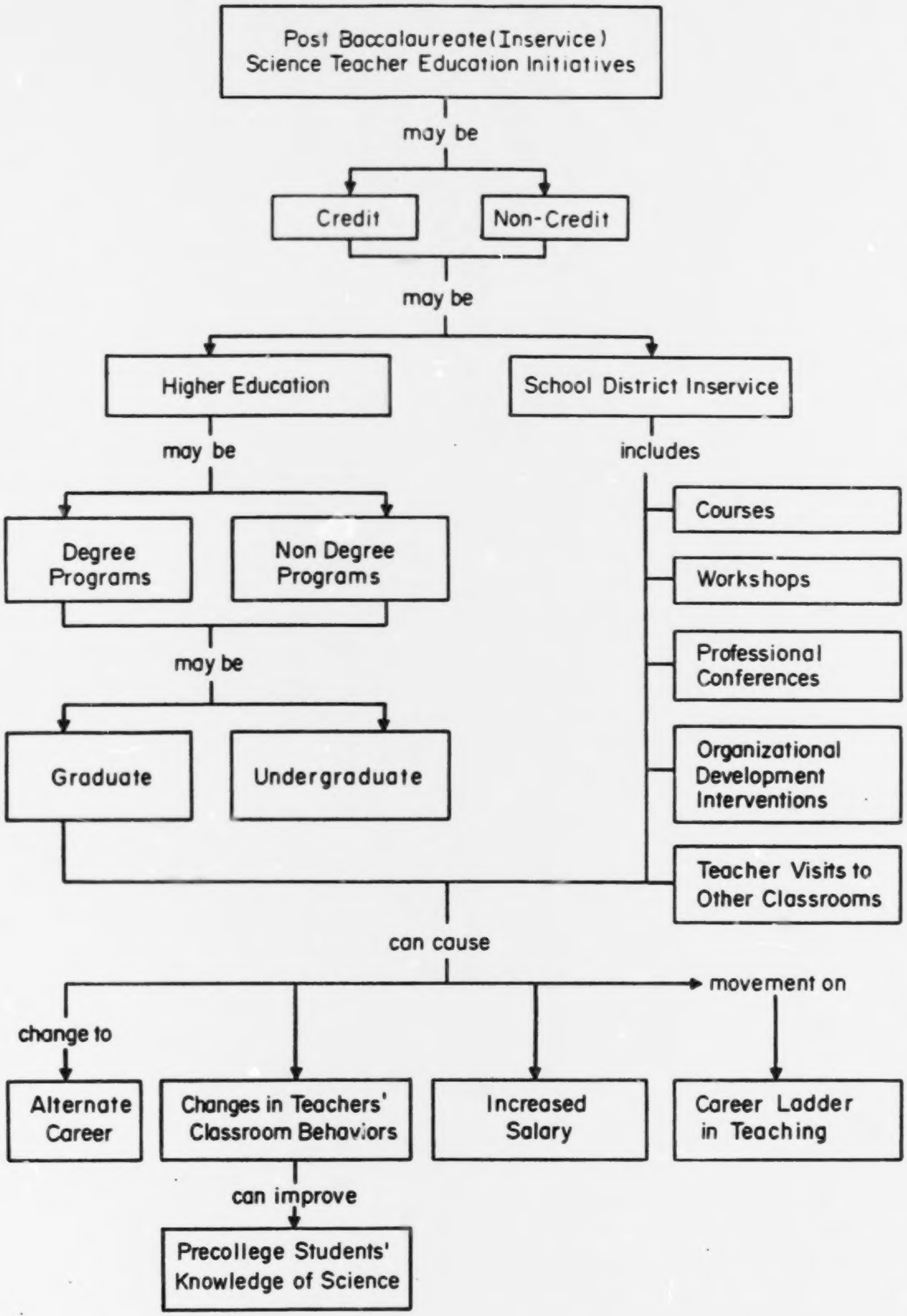

Post Baccalaureate (Inservice) Science Teacher Education Initiatives
may be
Credit
Non-Credit
may be
Higher Education
School District Inservice
may be
Degree Programs
Non Degree Programs
may be
Graduate
Undergraduate
includes
Courses
Workshops
Professional Conferences
Organizational Development Interventions
Teacher Visits to Other Classrooms
can cause
change to
Alternate Career
Changes in Teachers' Classroom Behaviors
Increased Salary
movement on
Career Ladder in Teaching
can improve
Precollege Students' Knowledge of Science

Figure 1-1. Initiatives Supported by Recent Funding for Inservice Science Teacher Education

any one of these initiatives, a teacher would participate in several activities. During a site visit series, one activity could be observing another teacher, a second activity might be analyzing students' responses to the teacher's lesson, and a third could be actively assisting the same group with a laboratory, thereby practicing a new laboratory management skill.

Ideally, school districts would have multidimensional, articulated programs which provide teachers with choices of initiatives. Individual teachers would analyze their own needs and develop personalized programs in which they would each string together a series of initiatives providing for continuous growth. There are few school districts currently doing this.

Inservice endeavors are based on the assumption that teachers will learn things that increase their professional expertise, thereby enhancing their ability to increase the quality and quantity of science taught K-12. In other words, the education is intended to be job related (see figure 1-2).

Intended learning outcomes (goals) for precollege science students

determine

↓

what the precollege science teacher needs to know and do

which determines

↓

the training needed by a precollege science teacher

which determines

↓

the design of inservice teacher education programs.

Figure 1-2. Assumption upon which inservice science teacher education is based (adapted from Spector, 1985)

Many scientists believe it compromises a college's integrity when undergraduate or graduate credit is awarded for courses which have the unique scope and rigor related to the science teaching profession.

They insist that science credit be awarded only for basic science courses in a developmental sequence designed for professional scientists rather than for professional science educators. The presence of this philosophical difference is evident in the wide variety of formats seen in today's inservice science teacher education initiatives.

Funding agencies are supporting a variety of formats and delivery systems for inservice science teacher education. The diversity of approaches and the common skepticism of teachers regarding the usefulness of inservice activities leads one to question the assumptions upon which decisions are being made. Is research being used as a basis to determine the best and most practical programs to implement? What research is available on inservice science teacher education which can be used by decision makers in their planning to mitigate the crisis?

Purpose of this Yearbook

This yearbook presents a review of research on inservice science teacher education K-12 and describes components which the research suggests are the best and most practical to include in inservice programs. It identifies (1) emergent questions to be answered by those accepting responsibility for inservice, (2) variables to be considered, and (3) optional components to collect needs survey information, design appropriate implementation models, develop incentives for teachers to participate, and determine evaluation procedures and criteria. Chapter 6 introduces a framework to assist the reader in developing a systematic process for decision making about inservice science education.

The information is intended as a resource for educators of teachers in science to share with all members of the educational enterprise and those external to it who influence policy and practice in post-baccalaureate science teacher education. It sets the stage for all people interested in, and/or becoming involved with, inservice science teacher education to experience success. This includes legislators, state education agency personnel, school board members, administrators and supervisors in precollege systems and higher education, science education faculty and science faculty in higher education, precollege teachers, professional education associations and unions, parents, representatives of business/industry, and civic groups.

Inservice can be initiated by policymakers or practitioners. It can come from the top down in a hierarchical structure or from the bottom up. Everyone, regardless of position, who wants to initiate or nurture inservice science teacher education programs can play a vital role in insuring that effective inservice occurs in an area.

Science teacher educators can gain maximum benefit from the new people who are expressing concerns about inservice science teacher education by involving them and helping them establish a common vocabulary with which to communicate their intent and a common set of research based assumptions from which to make decisions. The latter is essential because there are influential people who are making decisions based on the fallacious assumption that knowledge of science without knowledge of science education is sufficient to teach in secondary schools.

Permission givers, enablers, and practitioners, regardless of whether they are housed in a federal agency, a state agency, a school district, or a single school, can use information from this guide. For example, it can serve as a resource when:

- a legislator wishes to set parameters for a bill supporting post-baccalaureate science teacher education to insure that initiatives funded will be cost effective,
- a federal or state grant program officer is designing a Request For Proposal (RFP) open to any formal or informal educational agency in the nation or state to compete for available inservice monies,
- a state agency is soliciting plans for use of "pass through" funds directed to school districts only after submission and approval of inservice plans,
- a state agency is developing criteria to use in assessing the quality and acceptability of school districts' plans before dispersing federal pass through funds,
- a university professor is writing a proposal seeking inservice science teacher education funds,
- an informal education agency, e.g., museum, aquarium, theme park, research station, is exploring its potential to contribute to inservice science teacher education,
- a principal in a senior high school is establishing how much money to give to different departments for inservice based on expectations for the most improvement,
- a principal of an elementary school wishes to insure the introduction and/or an increase in science taught to all students in the building through inservicing staff,
- an administrator is approving release time for science teachers to attend inservice activities,
- a science supervisor or staff development officer is responding to a school board's request for a detailed plan to inservice science teachers which will be used in competition for board allocated school improvement money,

- a science teacher has an opportunity, or desires to create an opportunity, to determine characteristics of an inservice experience to meet his/her individual needs,
- a science educator is determining what to include in a series of inservice workshops for science teachers in a particular school,
- any planner wants to insure that the fidelity of an idea is retained as it passes through the steps leading to fruition.

Data Base for Decision Making

There are decisions to be made every step of the way from making funds available to bringing science teacher education initiatives to fruition. The quality of those decisions will determine how long funding will continue to flow into science teacher education and ultimately, the quality of life in our scientific and technologically based society.

Science education is supported primarily by public money. Consequently, it is subject to the vagaries of the political processes at all levels. All too often this results in inservice monies specific for science being approved and allocated for use within a defined time limit. The time to spend the money is frequently so short that there is little or no time for appropriate planning.

One can expedite planning and increase the potential that the decisions made will lead to successful initiatives by having (1) a predetermined systematic procedure for decision making, (2) a framework outlining categories of information needed, and (3) a list of research based options which may be adopted, adapted, or used as a stimulus to develop other options. The components spelled out in the chapters that follow may be mixed and matched as local circumstances dictate. Whether one is in a rural, suburban, or urban setting, a check list tailored to the uniqueness of the setting could be derived from data herein.

Where there are ongoing inservice funds and one can plan with some certainty to have a specific allocation for inservice, science is usually competing with other disciplines for a share. The individuals who can document the effectiveness of past initiatives and current needs, have well designed plans to meet those needs, and are ready to execute them immediately are likely to get the lion's share of the funding.

Assuming that inservice science teacher education is part of an ongoing process (not a single event), there is need for an action plan which can be used to refine existing endeavors and/or generate new science teacher education initiatives. A discrepancy model holds much promise as a vehicle for generating successful action plans for inservice models. In a discrepancy model, one identifies the existing state, the desired state, potential blocks to achieving the desired state, optional procedures to overcome the blocks to reach the desired state, and criteria to know when the desired state has been attained.

This volume provides guidance in identifying the kinds of data that are useful and ways to collect, analyze, and synthesize these data which can be used with a discrepancy model for planning at all levels.

Included are descriptions of specific ways to systematically identify needs, select program designs, design delivery procedures, create incentives for teachers to participate in programs, implement programs, evaluate inservice programs, and maintain successful programs.

The Inservice Audience: A Complex of Needs

One of the complicating factors in designing inservice education opportunities for teachers within a given geographical area, school district, or individual school is the diversity of expertise which exists in the potential client audience for whom the instruction is designed (see figure 1-3). In a single state or school district, one finds senior high school teachers and middle/junior high school teachers holding: (1) undergraduate and/or graduate degrees in science education, who remain current at their own expense, are high performing, and want to continue studying, (2) undergraduate degrees in science education from many years ago who need updating and who may or may not desire a graduate degree, (3) undergraduate degrees in non-science who acquired minimum certification, need a stronger base, and need updating, (4) undergraduate degrees in science with no certification to teach science, (5) undergraduate degrees in science, science graduate credit in a profession with no certification to teach science, (6) undergraduate degrees in non-science disciplines with no certification to teach science.

The teachers in category six constitute a major new audience for inservice science teacher education. In California, undergraduate colleges are producing one-fifth the number of science teachers necessary to supply the state of California. Florida, Texas, and other states face similar situations. This shortfall results in a demand to retrain teachers who are surplused from other disciplines so they can teach science and puts new demands on post-baccalaureate education in science education.

Most elementary school teachers are not certified in science, do not have undergraduate degrees in science, have taken a minimum number or no college science courses, and suffer from science anxiety.

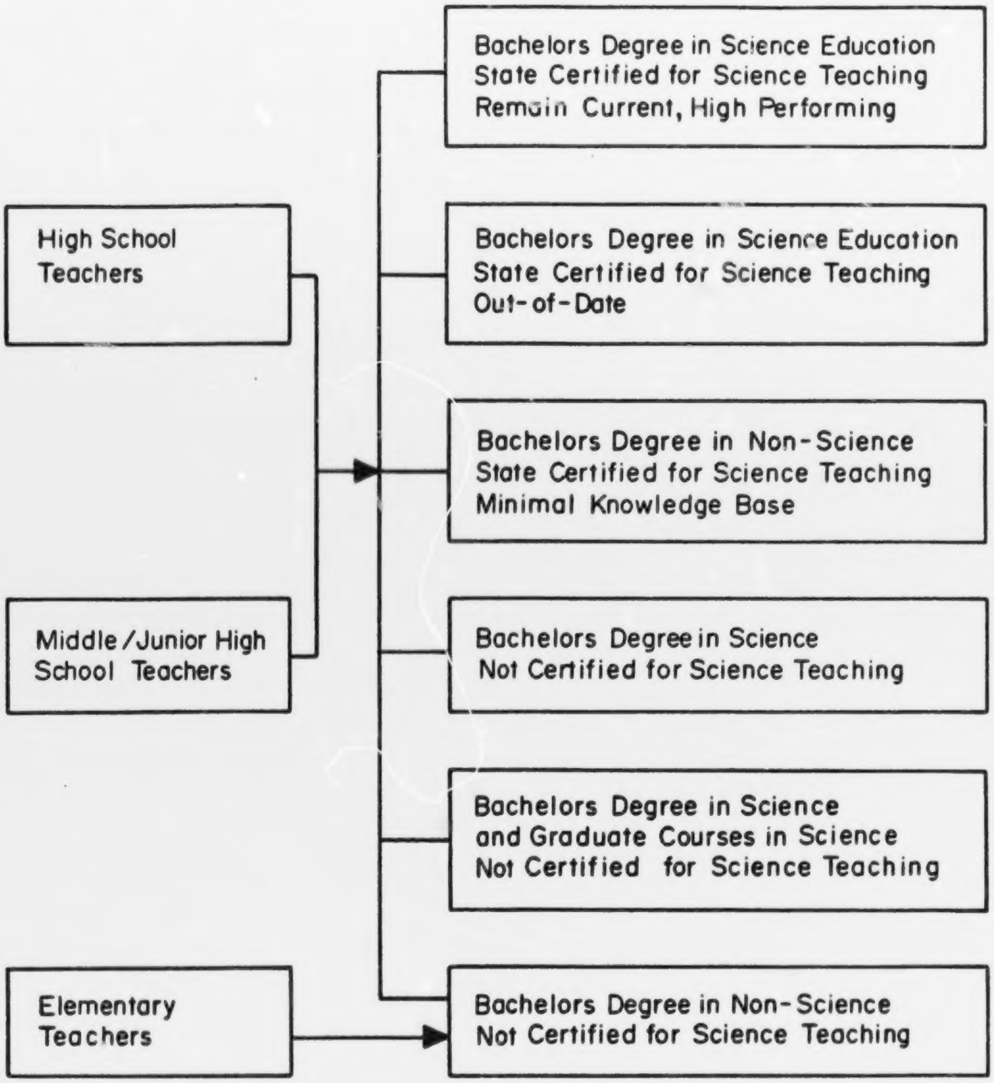

High School Teachers
Middle/Junior High School Teachers
Elementary Teachers
Bachelors Degree in Science Education State Certified for Science Teaching Remain Current, High Performing
Bachelors Degree in Science Education State Certified for Science Teaching Out-of-Date
Bachelors Degree in Non-Science State Certified for Science Teaching Minimal Knowledge Base
Bachelors Degree in Science Not Certified for Science Teaching
Bachelors Degree in Science and Graduate Courses in Science Not Certified for Science Teaching
Bachelors Degree in Non-Science Not Certified for Science Teaching

Figure 1-3. Background of Potential Audience for Inservice Science Teacher Education Initiatives

In addition to the diversity of formal education in the potential inservice audience, there are other factors complicating the profile and demanding indepth needs assessment procedures. First, several states are experimenting with career ladders and with merit pay. In some plans, teachers are required to have specific post-baccalaureate education to be eligible for merit pay and/or progress up the career ladder. Secondly, teachers progress through stages of development during their careers in school. Some of the stages manifest a change in focus of concern from self survival, to task, to impact on students (Fuller, 1969). Another aspect has been labeled "burn out." Depending on the number of years people have taught, the type of experiences to which they have been exposed, and the career options available to them, they will have different perceptions of what would be useful job related inservice education.

In some cases, teachers will want education that will enable them to assume the role of a change facilatator for science improvement within a school, a district, a state, or the nation. In other instances they will be focusing exclusively on updating the acquired body of knowledge in science, in technology, and in the interaction of science, technology, and society (S/T/S), in science education research, and/or in materials for their own instructional use. Still others will want to learn skills to improve their individual well-being such as managing stress, improving interpersonal skills, and making attitude changes. Improving the well-being of the teacher improves the prospect for students to learn more science in school.

Personnel who plan science school improvement efforts may wish to use inservice science teacher education as an instrument to effect a specific change in a school, district, or state. In that case, the planners dictate what a teacher needs to learn from an inservice experience. The planners may wish to disseminate and implement a specific new program, curriculum, or course; overhaul an existing program; develop a state, district, or school wide curriculum; improve teachers' skills with scientific equipment including computers; enhance teachers' problems solving skills; alter teachers' attitudes towards science; or improve the psychological climate for science in the schools. Inservice initiatives would have to be tailored to meet each of these needs.

Life-long-learning Skills

Life-long-learning is a key to successful science teaching. Ideally, teachers model the life-long-learning of science for students. Helping teachers identify their own needs and options to meet those needs would facilitate the process and help maximize the time teachers devote to study. They could elect to continue learning through such vehicles as individual professional readings, participating in professional organizations, attending professional conferences, going on study trips, enrolling in college courses or degree programs, or initiating inservice activities outside an institution of higher education. They would be prepared to give significant personalized input throughout their careers whenever there was opportunity to respond to a needs assessment conducted by inservice education designers.

Teachers could be taught to use a career and life planning diagnostic process. The process could be a self-study using qualitative research methods to reveal career goals, learning styles, personal interests, sources of motivation, tolerance for ambiguity, value systems, perceptions of the roles and responsibilities of a science teacher, and other items that influence a teacher's professional and personal behavior (Spector, in progress). Part of the diagnostic process would identify professional education, science, technology, and S/T/S competencies achieved through prior education and experience and, concomitantly, those competencies requiring further study.

The process would include a prescription identifying (1) that which the teacher needs to learn, (2) criteria by which to determine when the item has been learned satisfactorily, and (3) optional instructional strategies from which to learn the item based on the individual's learning style, ultimate use of the item, time constraints, and geographical and fiscal constraints.

This process is particularly suitable for those who teach science because it is actually giving them an opportunity to apply the scientific method to their lives while practicing a process they can teach to their students to aid in career awareness and planning.

A significant factor contributing to today's crisis in precollege science is that the average science teacher in the U.S. is in the mid to late forties and has not engaged in any updating in more than ten years. If we are to avoid another crisis in the future, we need to develop inservice science teacher education mechanisms that encourage and facilitate a teacher's life-long-learning.

In Summary

- The critical nature and the political dimensions of the need to improve precollege science teaching suggests "quick fixes" are necessary but they are not sufficient.
- More funding is available today for the post baccalaureate education of inservice teachers of science than in the past decade or longer.
- The ranks of the permission givers, enablers, and practitioners of education of teachers in science are swelling with new players making decisions based on questionable assumptions.
- Business/industry and formal and informal education agencies are offering inservice education to teachers of science.

- Collaboration among disparate groups with potential to contribute to science education is the watchword.

- A common vocabulary and a research based system including a collection of options for decision making are needed to expedite productive responses to offers of support for new initiatives.

- Some age-old unresolved conflicts within the profession are haunting us.

- The diversity in the potential teacher client audience is awesome.

- The societal trend toward self help and away from the dependence on the parenting role of institutions must be fostered among teachers of science by encouraging them to commit to continuing education and helping them develop diagnostic skills to guide their own life-long-learning.

The time is right for educators of teachers in science to be creative in approaches to mitigate the present crisis in precollege science and insure that ongoing long range mechanisms for inservice science teacher education are securely in place to avoid another crisis in the years to come.

A Search for Excellence in Inservice Science Teacher Education Programs will be conducted in the future. The research-based components in the forthcoming chapters in this yearbook can contribute to the development of many excellent programs. The information can assist everyone concerned with attaining excellence in the post-baccalaureate education of teachers of science.

REFERENCES

Fuller, Francis F. "Concerns of Teachers: A Developmental Conceptualization." The American Education Research Journal. 6 (2): 207-226, 1964.

Harms, Norris and Stuart R. Kahl, et al., The Status and Needs of Pre-College Science Education: Report of Project Synthesis. Final report to NSF for Grant SED 77-19001, Washington D.C., 1981.

Minnesota Science Assessment Research Project. Images of Science Report. Results of the 1981-1982 National Assessment of Educational Progress in Science. Minneapolis, Minnesota Research and Evaluation Center, 1982.

Spector, Barbara S. "Generating a Desired State for Master's Degree Programs in Science Education Through Grounded Theory Research." Journal of Research in Science Teaching. 22 (4): 327-345, 1985.

Chapter 2

GUIDELINES FOR EFFECTIVE SCIENCE TEACHER INSERVICE EDUCATION PROGRAMS: PERSPECTIVES FROM RESEARCH

Thomas P. Evans

It has been predicted that the 1980's will become known within the history of American education as the decade of inservice education just as the 1960's is known as the decade of course content improvement projects, sometimes improperly labeled as curriculum development. Whether this prediction becomes a reality or not is yet to be determined, but, the midpoint of the decade certainly found an unprecedented interest in science teacher inservice education by the science education community and persons concerned with improving the teaching and learning of science.

The reason for the current interest in science teacher inservice education is the result of a variety of factors and events that took place during the 1970's and early 1980's. The tight job market and declines in public school enrollments of the 1970's resulted in reductions in teacher turnover and enrollments in science teacher education programs. Many public school science departments found themselves with stable, tenured staff whose training was in need of updating. During the same time, federal and state money for adequate support of science teacher education at all levels became unavailable. Although the science education community was acutely aware of the need for greater support for science teacher education programs, it was unable to enlist the support of a complacent government and general public whose interests were directed toward the state of the economy. In the early 1980's, the general public and government became immediately interested in the quantity and quality of science teaching, largely as a result of the publication of a Nation at Risk: the Imperative for Educational Reform (the National Commission on Excellence in Education, 1983) and other reports about American education. This was followed by an increase in most states in the number of science credits required for high school graduation and/or admission to colleges and universities. Since there was an immediate shortage of qualified science teachers to fill the increased demands, many states relaxed, or provided alternatives to, basic science certification requirements. As a result, the midpoint of the 1980's found an alarming number of science classrooms throughout the United States with teachers who needed updating or were unqualified. A logical reaction to this dilemma was to increase interest in science teacher inservice education.

The amount of literature devoted to inservice education is vast and offers many opposing and contradictory positions and points of view. Yet, there is a surprisingly large amount of agreement (Hutson, 1981). The current interest in science teacher inservice education illustrates one point of agreement; i.e., inservice education is seen as an important and necessary factor for improving teaching and learning. At the same time, a majority of educators have a negative attitude toward inservice education. Hutson (1981) reported that there is near-unanimous agreement concerning the status of current inservice practices; they are deplorable. Wood and Thompson (1980) agree with this position. They report that most inservice education, as it is now conducted, is irrelevant and ineffective. It is a waste of time and money. Unfortunately, an examination of current practices supports these positions. Inservice education programs are poorly planned, based on unclear objectives, irrelevant to teacher interests and needs, and poorly supported. They seldom are part of an ongoing organizational plan. Over emphasis is placed on dissemination and assimilation of information. They are viewed as a means for overcoming teacher shortcomings rather than as a continuation of professional development. Inservice education programs are being planned and implemented as if little or no research evidence was available on how, when, where, and under what conditions to conduct effective inservice education.

This chapter is the result of an examination of selected research and reviews of research on inservice teacher education. Its purpose is fourfold: (1) to identify general guidelines for planning, implementing and evaluating inservice education programs in science education that have support in the research literature, (2) to examine each guideline while summarizing the supporting research, (3) to comment on the overall nature of inservice education research and (4) to offer recommendations for future practice and research. The chapter is written with two underlying beliefs in mind. First, even though inservice education programs in science education are constantly plagued with problems from within and without the profession, it is and will remain an important component of science teacher education. Science teachers do not, and should not, cease their professional development upon completion of a preservice teacher education program. Secondly, inservice education programs in science education, properly defined, conceptualized, researched, planned, supported, implemented, and evaluated can and should be effective in bringing about significant improvements in the teaching and learning of science.

Guidelines

An exhaustive search was made of research reports and reviews of research on inservice teacher education to identify research evidence for use in establishing guidelines for planning, implementing and evaluating effective inservice teacher education programs. Sources for the search included Current Index to Journals in Education, ERIC documents, Dissertation Abstracts International, Science Education, School Science and Mathematics, Journal of Research in Science Teaching, Education Index, Encyclopedia of Educational Research, Investigations in Science Education and reference lists in journal articles. The criteria for selection were that the research document: (a) dealt with procedures for conducting inservice teacher education programs, i.e., how, when, where, and under what conditions to conduct inservice teacher education programs, and (b) provided enough description about the design, findings, and conclusions to determine if it met the first criterion. Initially, the search was limited to science teacher inservice education, but it was later expanded to research that included but was not restricted to science teachers because of the scarcity of research dealing with procedures for conducting effective science teacher inservice education programs. A select number of studies is included that did not involve science teachers because of their potential application for inservice teacher education in general. Qualitative as well as quantitative research was selected, and no studies were eliminated on the basis of having poor internal or external validity.

One hundred thirty research documents appeared to meet the stated criteria and were selected for review and analysis. From these documents, 22 guidelines (see figure 2-1) were derived for planning, implementing, and evaluating inservice education programs and activities for science teachers. Each guideline is presented individually even though they are not mutually exclusive. The order in which they are presented does not imply a hierarchy. Selected research documents are referred to in the discussion for illustrative purposes and not because of the quality or importance of the research. Space does not allow a discussion of every research document, but the documents used to derive each guideline are identified in tabular form in Table 1 at the end of this chapter.

Collaborative Effort

1. Every aspect of an inservice education program, including assessment of needs, planning, implementation, follow-up, and evaluation should reflect a collaborative effort on the part of those persons involved in and affected by the program.

   Eighty-three of the 84 research documents used to derive this guideline support the use of a collaborative effort in planning, implementing and evaluating inservice education programs. Only the research by Urdang (1982) provides evidence against using a collaborative approach. It is clear from the available research that inservice education programs are perceived as being more effective when they result from a collaborative effort. A variety of explanations have been put forth to account for this phenomenon, some of which are based in research while others are simply speculative. One explanation identified by Patton and Anglin (1982) is that teachers develop negative reactions toward inservice because of the feeling of lack of ownership. They report, however, that a sense of ownership can be established through a collaborative process involving teachers, university personnel, school administrators and community members.

   A second explanation involves commitment on the part of teachers and administrators. Commitment is a crucial factor in determining the success or failure of an inservice education program (McLaughlin & Marsh, 1978). Weiner (1974) found that involvement in the selection of aims, procedures, and evaluation process in any setting results in a deeper commitment to change and increases the probability of learning and changing.

1. Every aspect of an inservice education program, including assessment of needs, planning, implementation, follow-up, and evaluation, should reflect a collaborative effort on the part of those persons involved in and affected by the program.
2. Inservice education programs should be well-planned.
3. Inservice education programs should be based on clear and precisely stated goals and objectives that are congruent with those of the teachers, school, and community.
4. Inservice education programs should focus on assessed needs, interests, and concerns of the teachers, school, and community at the local level.
5. Inservice education programs should be ongoing, developmental, and an intergral part of a total school program.
6. Inservice education programs should utilize a variety of instructional strategies to accommodate differences in teacher needs, preferences, and learning styles.
7. Inservice education programs aimed at the enhancement of teaching skills should include modeling, practice, and feedback.
8. Inservice education programs aimed at the acquisition of teaching skills should include theory, modeling, practice, and feedback.
9. Inservice education programs should provide some opportunities for teachers to choose the inservice activities in which they are to participate.
10. Inservice education programs should be directed toward changing teacher behavior rather than student behavior.
11. Inservice education programs should include intrinsic and extrinsic incentives that promote a high level of participation, commitment, and performance.
12. Inservice education programs should stress incentives that place emphasis on intrinsic professional rewards.
13. Inservice education programs should be supported through the provision of positive administrative leadership and adequate funds, materials, time, and human resources.
14. Inservice education programs should be explicitly supported at the onset by district and school administrators and that support should be sustained throughout the program.
15. Inservice education programs should include principal and administrative staff participation in the inservice activities.
16. Inservice education programs should utilize the school site as the focus of program activities.
17. Inservice education programs should model good teaching practices.
18. Inservice education programs should reflect the application of general principles of learning, particularly adult learning.
19. Inservice education programs should be planned, implemented, and evaluated with fostering a positive view of self on the part of participants serving as the major guiding force.
20. Inservice education programs should include follow-up as an integral part of the programs.
21. Inservice education programs should be complex and ambitious.
22. Inservice education programs should include an evaluation component whose primary purpose is to assist with planning and implementing programs.

Figure 2-1. Guidelines for Effective Science Teacher Inservice Education Programs

According to Zigarmi, Betz, and Jensen (1977), teachers become more committed to inservice education programs when they take part in the planning and feel that they have some control over the program activities.

A third explanation involves a reduction in the resistance that normally takes place when a person who is the target for change perceives the change as a threat to his or her autonomy. According to Withall and Wood (1979), this resistance can be mitigated by creating a condition in which the person targeted for change participates in the goal-setting and selection of procedures to follow in the change process.

A fourth explanation revolves around the fact that administrators and teachers do not agree in their preference of content, methods, and planning strategies to be used in inservice education programs (Christensen & Burke, 1982; Mazzarella, 1980). As a result, teacher input into an inservice program on a collaborative basis is more likely to result in activities that appeal to teachers. A contributing factor may be that a collaborative effort improves the quality of the program by having input from multiple sources. Another factor may be that a collaborative effort reveals to teachers that decisions about the inservice program are being based on competence rather than position (Hutson, 1981).

Regardless of the explanation, inservice education programs should be the result of a collaborative effort. It increases the probability of the program being effective, particularly if the program is to be judged by teachers' perceptions of effectiveness.

Well-Planned

2. Inservice education programs should be well-planned.

It should not be surprising that teachers hold negative views toward inservice education programs when the most frequent criticism of the programs is inept, inadequate, or nonexistent planning (Joyce et al., 1976; King et al., 1977). Good planning alone does not guarantee effectiveness, but a well-planned inservice education program that is collaborative and considers every aspect of the program before it is implemented has a higher probability of being effective. Twenty research documents identified in Table 1 support the position that effective inservice education programs must be well-planned. The reported findings in these documents further support a position that it is counter-productive to subject teachers to an inservice education program that is poorly planned.

Goals and Objectives

3. Inservice education programs should be based on clear and precisely stated goals and objectives that are congruent with those of the teachers, school and community.

   The use of clear and precisely stated goals and objectives that are congruent with those of the teachers, schools and community for planning, implementing and evaluating inservice education programs is sound educational practice. It is a practice that has support in 25 of the research documents identified in Table 1. For example, Korinek, Schmid, and McAdams (1985) reported that seven of the reviewed documents mentioned the need for clear and specific goals. McLaughlin and Marsh (1978) and Berman and McLaughlin (1978) found that achieving conceptual clarity of goals as a result of a collaborative effort increased the likelihood of achieving the goals. In actual practice, however, it appears that the use of clear and precisely stated goals in inservice education programs is not common practice. Wilen and Kindsvatter (1978) reported in a review of research that the reason many inservice education programs were not successful was that the goals and objectives were not sufficiently defined. Ellis (1975) found that 95 percent of the school districts in New Hampshire did not have written objectives for their inservice education programs. Clear and precisely stated goals and objectives that are congruent with those of the teachers, school, and community provide meaningful direction for inservice eductation programs. They are among the essential components of effective inservice education programs.

Assessed Needs

4. Inservice education programs should focus on assessed needs, interests, and concerns of the teacher, school, and community at the local level.

   Inservice education programs have a high probability of being successful if they are perceived by teachers as being related to their needs, interests, and concerns and as having direct application in the classroom. This is the message provided either directly or indirectly by the 70 research documents identified in Table 1 as relating to this guideline. Teachers not only will perceive the inservice program as being successful, but, more importantly, they are more likely to transfer what is learned into the classroom (Bethel, 1982; Orlich & Ezell, 1975; Schiller, 1979; Timms, 1975; Townsend, 1979).

   The research supporting this and the collaborative effort guideline provides two additional messages. First, a needs assessment should be conducted at the local level and used as a data-base for planning inservice education programs (Korinek et al., 1985; Wilen & Kindsvatter, 1978). The needs assessment should be analyzed using a collaborative process. The purpose of the collaborative process is to personalize as well as establish the priority level of the assessment items. Those items seen as having a high priority should serve as the focus of the inservice education program (Mangieri & McWilliams, 1976; Patton & Anglin, 1982). Secondly, a needs assessment should be repeated at least once a year, because 75 percent of the perceived needs of a given group of teachers change over a 15 month interval (Marshall et al., 1982).

Ongoing and Developmental

5. Teacher inservice education programs should be ongoing, developmental, and an integral part of a total school program.

All but three of the research documents identified in Table 1 as relating to this guideline support the guideline. At first glance, the guideline may appear to be simply a question of duration, but this is not the intent. Contributing to this confusion is the use of inservice education programs and inservice education program activities as synonymous terms in the research documents as well as in actual practice. A few of the documents do support longer inservice education program activities over single-shot presentations, and the three documents not supporting the guideline are really questioning the relationship between effectiveness and program duration (Easom, 1981; McElhone, 1979; Wade, 1984). A comprehensive and effective inservice education program, however, can and should be made up of a series of related activities of varying durations. An activity directed toward changes in teacher classroom behavior requires more time than one directed toward information transmission and skill acquisition (Korinek et al., 1985). Effective inservice education programs are ongoing in that they grow out of the needs of teachers, schools, and communities, and they evolve rather than cease as the needs change. As a result of adequate support and commitment, the outcomes of the activities are implemented and become part of the total school program. Effective inservices are also developmental; i.e., they begin with and build on the existing professional competence of the entire school staff.

Variety of Instructional Strategies

6. Inservice education programs should utilize a variety of instructional strategies to accommodate differences in teacher needs, preferences, and learning styles.

Each teacher is an individual and comes to an inservice education program with different motivations, needs, interests, years of teaching experience, levels of competence, and learning styles. In order to maximize changes in teacher performance, effective inservice education programs should utilize a variety of instructional strategies, including self-instruction, college courses, workshops, interclassroom visits, teacher sharing, independent study, and peer-teaching. This guideline represents sound educational practice and is supported by 52 of the 53 research documents identified in Table 1. For example, Wade (1984) analyzed 91 research studies conducted between 1968 and 1983 using meta-analysis and reported that for maximum effectiveness an inservice education program should utilize self-instruction, independent study, or training at staff meetings rather than the traditional workshop format. The ultimate in variety would be to individualize inservice programs for each teacher. Eighteen of the identified research documents favored this approach. One research document (Easom, 1981), however, did not support individualization. She administered questionnaires to 1376 teachers and staff in 60 randomly selected school systems and concluded that individualization and flexibility of inservice education programs did not directly affect the impact of programs on teachers.

Skill Enhancement and Acquisition

7. Inservice education programs aimed at the enhancement of teaching skills should include modeling, practice, and feedback.

8. Inservice education programs aimed at the acquisition of teaching skills should include theory, modeling, practice and feedback.

All seven research documents shown in Table 1 directly or indirectly support these two guidelines involving the enhancement and acquisition of teaching skills. Joyce and Showers (1980) analyzed 200 research investigations in which efforts were made to determine the effectiveness of various kinds of training methods in changing teacher behavior. They reported that inservice training aimed at fine tuning a skill will likely be successful if it includes modeling and practice, under simulated and classroom conditions, combined with feedback. If the training is aimed at the mastery of a new teaching skill or strategy, it should also include presentation of theory and direct coaching during the practice. Wade (1984) analyzed 91 studies using meta-analysis and reported that observation of actual classroom practice, microteaching, video/audio feedback, and practice were the types of instruction that yielded the highest effect size. Coaching and modeling showed moderate effect sizes, but they were not significantly higher than the mean of all types of instruction examined. Lawrence (1974) reviewed 97 investigations and concluded that inservice education programs that emphasized demonstration, supervised, trials, and feedback were more successful in achieving their goals than were programs in which teachers were to store behavior prescriptions for use at some future time.

Teacher Choices

9. Inservice education programs should provide some opportunities for teachers to choose the inservice activities in which they are to participate.

It has already been pointed out that each teacher is an individual with differing motivations, needs, interests, experiences, and learning styles. Providing a variety of instructional activities and allowing individual teachers to choose from among the activities to further develop his or her professional competence would be sound educational practice that is supported by all but two of the 21 research documents related to this guideline. The research documents ranged in the amount of choice they supported from being completely voluntary to compulsory participation in all program activities. For example, Urdang (1982) pre- and post-surveyed 150 workshop participants and found that the factor having the strongest direct effect on participant attitude was voluntary participation in the workshop. Those participants who attended voluntarily had greater interest in the workshop topic, more positive attitude toward previous workshops, and higher expectations of workshop components. Brimm and Tollett (1974) reported that 89 percent of the teachers in their survey felt that individual teachers should have the opportunity to select the kind of inservice he or she needed to strengthen him or her professionally. However, 75 percent of the respondents felt that some inservice education activities should be required of all teachers. A majority of the 81 elementary teachers and principals interviewed by Dreisbach (1959) felt that attendance at inservice programs should be compulsory. Meta-analysis of 609 data sets by Wade (1984) did not reveal a significant difference in training effect as a result of whether an activity was voluntary or not. Considering all 21 research documents, the evidence suggests that inservice education programs would be more effective if teachers were allowed to choose at least some of the inservice activities in which they are to participate.

Changing Teacher Behavior

10. Inservice education programs should be directed toward changing teacher behavior rather than student behavior.

This guideline, supported directly or indirectly by 20 research documents identified in Table 1, reveals that an inservice education program should be directed toward the major criterion for determining program effectiveness, i.e., changes in teacher behavior. The guideline questions the use of student outcomes or changes in student behavior as the criterion of effectiveness, because in teacher education programs, the target for change is the teacher. As Medley (1977) pointed out in his review of 287 studies of teacher effectiveness, the assumption that there is a direct line of influence between teacher training and student outcomes is fallacious. Many factors not under the teacher's influence or control affect student outcomes. The guideline also questions directing inservice education programs toward changes in teacher perception, attitude, and/or knowledge without determining whether or not they are transferred into the classroom as changes in teacher behavior. The experiences teachers receive in teacher training programs should result in changes in their performance in the classroom.

Incentives

11. Inservice education programs should include intrinsic and extrinsic incentives that promote a high level of participation, commitment, and performance.

12. Inservice education programs should stress incentives that place emphasis on intrinsic professional rewards.

Teachers participate in and become committed to inservice education programs for a variety of reasons depending on their individual backgrounds, situations, and degree to which they are intrinsically and extrinsically motivated by incentives. Many teachers participate because it is required. They may or may not become committed to the program as a result of the characteristics of the program and/or type and degree of incentives offered. Other teachers participate whether it is required or not because they are intrinsically motivated to improve themselves professionally. Participation in the program may reinforce their intrinsic motivation, or the characteristics of the program may cause them to become disinterested. In other words, there is no magic formula for motivating teachers to participate in inservice education programs, become committed, and work hard toward improving their classroom performance. However, all but three of the 53 research documents relating to incentives in Table 1 provides evidence that inservice education programs are more likely to be effective if they include intrinsic and extrinsic incentives for motivating teachers.

Forty-one of the research documents in Table 1 directly support the desirability of including released time, university credit, recertification, extra pay, and/or salary increments as extrinsic incentives. Thirty of these specified released time as being a particularly effective extrinsic incentive.

Ten documents support placing emphasis on intrinsic incentives, i.e., activities and procedures that cause teachers to view the program as an excellent opportunity for improving their classroom performance (Berman & McLaughlin, 1978; Burrello & Orbaugh, 1982; Hutson, 1981; Joyce et al., 1976; Mangieri & McWilliams, 1976; McLaughlin, 1976; McLaughlin & Marsh, 1978; Smith, 1971; Smith, 1984; Wright, 1977). These research documents suggest the following intrinsic incentives as being effective for increasing teachers' commitment to inservice education programs: (1) involving teachers in the planning stage of the program, (2) making the project complex and ambitious, (3) providing opportunities for personal contact and interaction among persons involved in the program, (4) creating a climate of support and cooperation, (5) directing programs toward teachers' perceived needs, and (6) identifying the program as a school and district priority.

A slightly different approach for obtaining teacher commitment was reported in the Study of Dissemination Efforts Supporting School Improvement by Crandall (1983), Cox (1983), Huberman (1983), Loucks (1983), and Miles (1983). A combination of extrinsic and intrinsic incentives with emphasis being placed on intrinsic incentives was used, but the extrinsic incentive was strong and continuous administrative pressure on the teachers to develop or adopt a practice. This was followed by intrinsic incentives in the form of training by a credible person, substantial support and assistance, and mastery of the practice. As teachers saw results with their students, they became committed to the practice. Teacher commitment was developed after implementation of the practice.

Investigations by Dreisbach (1959), Easom (1981), and Urdang (1982) questioned the effectiveness of including extrinsic incentives in inservice education programs. Dreisbach reported that teachers and principals perceived inservice programs as important professional obligations without need for reimbursement for time spent in the program. Easom found that incentives for participation did not significantly alter the impact of inservice education programs on teachers. Urdang reported that participants receiving incentives had lower expectations of the workshops.

Support

13. Inservice education programs should be supported through the provision of positive administrative leadership and adequate funds, materials, time, and human resources.

14. Inservice education programs should be explicitly supported at the outset by district and school administrators, and that support should be sustained throughout the program.

It is very unlikely that inservice education programs will be effective if district and school administrators do not provide adequate levels of psychological and material support throughout the duration of the programs. All 57 research documents in Table 1 relating to these two interrelated guidelines directly or indirectly provide supporting evidence for this position. In fact, the level and type of support provided by district and school administrators may be the most important criterion for determining success or failure of an inservice education program because of the impact support has on every aspect of the program.

The importance of positive administrative leadership for effective inservice education is illustrated in a study by Little (1982). She found that teachers were more receptive to staff development in schools having high levels of collegiality. Such schools were characterized by having a principal who actively endorsed and participated in collegial work.

The provision of materials, time, and human resources require financial support. In a study of school administrators' perceptions of inservice education, Hewitt (1979) concluded that the costs of inservice education should be borne by the school district and budgeted at the school level. Further evidence supporting the necessity of allocating specific funds for inservice education were provided by Bigelow (1969), Hutson (1981), McLendon (1977), Miller (1982), and Wilen and Kindsvatter (1978).

The Rand Change Agent Study (McLaughlin & Marsh, 1978) and the Study of Dissemination Efforts (Loucks, 1983) are examples of research illustrating the need for explicit administrative support at the outset of the inservice education program and the continuation of that support throughout the program. Although the manner in which the administrative support was applied differed significantly, both studies found that explicit administrative support at the beginning and throughout the program was essential because of its positive influence on teacher commitment.

Principal Participation

15. Inservice education programs should include principal and administrative staff participation in the inservice activities.

The reported results in all 10 research documents in Table 1 relating to this guideline reveal that inservice education programs are more effective when the principal and administrative staff participate in the training activities. Participation by the principal and administrative staff sends a number of messages to the teachers. These include the following: (1) it reveals that the program has a high school priority and the commitment of the principal and administrative staff; (2) it helps to undermine the notion that many teachers have of the principal seeing them from a deficit point of view; (3) it reveals that the inservice education program is an integral part of the ongoing school program; (4) it demonstrates active administrative support for the program; and (5) it makes a positive contribution toward improving the school's organizational climate.

School Based

16. Inservice education programs should utilize the school site as the focus of program activities.

All but four of the 35 research documents relating to this guideline indicates that inservice education program activities are more likely to be effective if they are held at the teachers' work site. Teacher perception was the criterion of effectiveness in a majority of the documents. Lawrence (1974) reviewed 97 studies and concluded that school based and college based programs were equally successful in improving teachers' knowledge; however, school basd programs were more successful in improving teachers' attitudes and teaching skills. Joslin (1980) used meta-analysis to analyze 137 research reports and found a moderate effect size for inservice activities that took place within the local district. Wade (1984) found different results using meta-analysis to analyze 91 research reports. On-site training did not produce a statistically significant impact on effect size. Sea (1973) and Zigarmi et al. (1977) reported that local workshops were well received by teachers, but those held on college or university campuses received higher ratings. McElhone (1979) reported that teachers perceived workshops and summer school held on college and university campuses as the most useful types of inservice education. Overall, the reviewed research documents reveal that inservice education program activities may be effectively conducted at other sites, but the school site should serve as the focus of program activities.

Model Good Teaching Practices

17. Inservice education programs should model good teaching practices.

Wood and Thompson (1980) pointed out that one weakness of inservice education programs has been the failure to model the kinds of practices teachers are asked to use in their classrooms. The impact of this weakness on staff development becomes apparent when the old adage that teachers teach as they were taught is considered to be at least partially true. Inservice education programs must model good teaching practices if they are to become effective. Evidence supporting this guideline is provided by Burrello and Orbaugh (1982), Hutson (1981), and Patton and Anglin (1982). A positive step toward meeting the guideline could be made by implementing all the guidelines identified in this Chapter into inservice education programs. For the most part, the guidelines represent examples of good teaching practices.

Learning

18. Inservice education programs should reflect the application of general principles of learning, particularly adult learning.

The explicit inclusion of general principles of learning in the planning, implementation, and evaluation of inservice education programs represents sound educational practice. It is also directly supported by 33 research documents identified in Table 1 as relating to this guideline. Smith (1971) reported that inservice education programs that provided for the inclusion of activities based on principles of learning were perceived as being highly desirable by at least 80 percent of the 282 teachers surveyed. Fukushima (1981), McLaughlin and Marsh (1978), Smith (1984), and Wood and Thompson (1980) recommend that principles of adult learning should be incorporated into inservice education programs. Jamison (1981) reported that providing participants of inservice education programs with feedback concerning their progress was of considerable importance. Spector (1977) found that positive feedback increased teachers' willingness to change and test new behaviors. Twenty-six of the 33 identified research documents specifically addressed the need to place the teacher or learner in an active role. The research documents relating to other guidelines provide additional indirect support of this guideline. These include: (1) utilizing a variety of instructional strategies to account for individual differences in background, interest, and learning styles, (2) utilizing intrinsic and extrinsic motivation through the inclusion of incentives, (3) making the content more meaningful by basing it on the assessed needs of teachers, school, and community, and (4) allowing participants to set realistic goals through collaborative planning of inservice education programs.

Positive View of Self

19. Inservice education programs should be planned, implemented, and evaluated with fostering a positive view of self on the part of participants serving as the major guiding force.

It is paradoxical that most professional educators when questioned will state their acceptance of the importance of a positive view of self when it comes to learning and modifying behavior. Yet, an examination of inservice programs and activities, as well as classroom practices, frequently reveals a lack of concern for fostering a positive view of self. This is a deplorable situation and may largely account for the negative attitudes that educators hold toward inservice education. In the 1962 Yearbook of the Association for Supervision and Curriculum Yearbook (Combs, 1962), it is pointed out that persons with a positive view of self are open to experience and more able to adapt. They can more effectively assess their own strengths and weaknesses and act on the need for self-improvement. They keep growing steadily in chosen ways. They are able to revise their values and accept new goals. They have a backlog of success; therefore, are not afraid to take chances. They are more able to cope with problems inventively as well as realistically. They are more amenable to change. In fact, they are able to initiate as well as accept change. Overtly fostering such characteristics must become an integral part of every inservice education program. Failing to do so defeats what should be the underlying purpose of inservice education, i.e., changing teacher behavior.

Although business and industrial models are largely inappropriate for educational settings, research involving human interactions, productivity, and attitudes in employer-employee situations does provide educators with useful information. A case in point is the research by Peters and Waterman (1982). They reported that the ability to get unusual effort from ordinary employees characterized excellent companies. Several factors were identified as fostering unusual effort on the part of employees. These included giving the employee at least partial control over his or her own destiny, encouraging an individualistic entrepreneurial spirit, making them members of winning teams, and recognizing each employee as a star in his or her own particular right. Such factors tend to provide employees with a more positive self-image. Peters and Waterman further reported that less-than-excellent companies take a negative view of their employees and actually design systems to tear down employees' self-images.

Each of the remaining 21 research documents supports these guidelines as well. The need for support and encouragement was mentioned as a desirable element of inservice education programs by over one-half of the 146 elementary teachers interviewed by

Ainsworth (1974). Turner (1970) surveyed 458 teachers and reported that one factor contributing to effective inservice was a relaxed and nonthreatening climate in which participants felt free to criticize and express opinions. The importance of establishing a nonthreatening, open climate and atmosphere of trust, respect, and cooperation in inservice education programs were reported by Edwards (1975), Holly (1977), Kaz (1971), Marsh (1960), Smith (1984), and Thompson (1982). Spector (1984) found that teachers were willing to try new behaviors to the extent that their past experiences had been satisfying. The implications of the reported results in all 22 research documents identified in Table 1 as relating to this guideline is that teacher inservice education programs must attend to the development of more positive views of self on the part of teachers and administrators if they are to become effective in changing teacher performance in the classroom.

Follow-up

20. Inservice education programs should include follow-up as an integral part of the programs.

Four different but interrelated reasons for including follow-up activities as an intergral part of inservice education programs were identified in the 2 research documents associated with this guideline. First, it was pointed out that follow-up of inservice education programs was perceived by 65 percent of the teachers surveyed to be inadequate in their schools (Brimm and Tollett, 1974). The survey included 646 teachers representing 147 school districts. Second, teacher perceived mastery of inservice program objectives did not assure application of the objectives into classroom practice (Timms, 1975). Third, teachers returned to or below their baseline behavior in a very short time when they transferred what was learned in an inservice activity into the classroom unless they received follow-up assistance (Purifoy, 1980). Fourth, teachers who received tutoring and follow-up assistance significantly implemented the objectives of the inservice training program more than did teachers who only received the training (Mitchell, 1978). Individualization of instruction was the objective in Mitchell's study. All 22 of the research documents provide evidence of the need to include follow-up as an integral part of inservice education programs.

Complex and Ambitious

21. Inservice education programs should be complex and ambitious.

The finding that inservice education programs were more likely to be effective when they were complex and ambitious was corroborated by all six research documents shown in Table 1.

According to the Rand Change Agent study, complex and ambitious programs appealed to teachers' sense of professionalism and resulted in a higher proportion of teachers committed to the program (Berman & McLaughlin, 1978; McLaughlin, 1976; McLaughlin & Marsh, 1978). Hutson (1981) reported that such programs would less likely be trivial and routine and, consequently, more likely to appeal to teachers.

Evaluation

22. Inservice education programs should include an evaluation component whose primary purpose is to assist with planning and implementing programs.

A review of the research documents relating to this guideline reveals that evaluation is an essential but frequently neglected component of effective inservice education. All 28 of the research documents directly or indirectly support the guideline. For example, Feinberg (1974) surveyed 204 schools and reported that one of the eleven factors characterizing schools engaging in highly effective inservice programs was evaluations of the programs in terms of established program objectives. Kaz (1971) found that the presence of evaluation at the conclusion of inservice education programs was perceived by teachers to be a practice associated with the most beneficial programs. Miller (1982) reported that a key to successful inservice education programs was a systematic and relevant set of evaluation procedures. Hutson (1981) and Jamison (1981) pointed out the desirability of using the results of evaluations for making decisions concerning the planning and implementation of inservice education programs.

In addition to supporting the guideline, several suggestions for conducting evaluations were provided by the research documents reviewed. Included were the following: (1) evaluation should be ongoing or continuous; (2) evaluations should include multiple data sources; (3) evaluations should be based on stated program objectives; (4) evaluations should result from a collaborative effort; (5) every aspect of the program should be evaluated; and (6) evaluation results should be communicated to the participants.

Evidence that evaluation is a frequently neglected aspect of inservice education was provided by Ellis (1975) and Bigelow (1969). Ellis received 33 responses from questionnaires sent to 42 central offices and found that 92 percent of the school districts did not evaluate their inservice programs in writing. A survey by Bigelow of the inservice coordinators in 152 school districts revealed that there was a need for more systematic and objective evaluation of inservice programs.

Nature of Reviewed Research

One hundred thirty research documents met the stated criteria and were selected for inclusion in the review. The reported results of these documents were used to derive the 22 guidelines for planning, implementing, and evaluating effective inservice education programs and activities for science teachers. As part of the review process, the documents were sorted into six categories based on the research procedures that were described in or could be inferred from the documents. The research procedure of the first category involved developing an "ideal" model or set of guidelines from the literature and/or expert opinions and comparing the model or set of guidelines with perceptions of existing practices using interviews, surveys and/or case studies. Twenty-eight documents were placed into this category. The research procedure of 60 documents in the second category was characterized by the use of surveys, interviews, delphi techniques, and analyses of descriptions of practice to measure the attitude toward, preference for, value of, and perceptions of effectiveness of existing inservice teacher education programs and practices. The third category consisted of 15 documents. The research procedure used in this category consisted of a review and analysis of existing literature and/or research. The fourth category included 14 documents in which ethnographic techniques served as the research procedure. As a result of multiple descriptions of the same research, these 14 documents represented only seven separate research projects. The fifth category was made up of 10 documents in which pretests and posttests were used without a control group, or if they included a control group, it was not established through randomization. The criteria of effectiveness were primarily measures of teachers' knowledge, beliefs, attitudes, and/or perceptions of practice. Posttests and random assignment to groups characterized the three research documents in the sixth category. The criteria of effectiveness included classroom observation and measures of teachers' knowledge, interest, and ratings of usefulness.

An overall appraisal of the reviewed research documents revealed a number of conceptual and technical inadequacies that must be considered in summarizing and analyzing the reported results and conclusions. One of the most obvious conceptual inadequacies was the lack of agreement on the meaning of the term, inservice education. Compounding this problem was the use of a variety of terms used interchangeably with inservice education such as staff development, continuing teacher education, and professional development. A third conceptual inadequacy was a lack of precision in the language pertaining to inservice education and in the criterion instruments used to measure the effectiveness of inservice education programs. Lack of agreement on the objectives of inservice teacher education was a third conceptual inadequacy. A majority of the research documents did not identify the objectives of the various inservice education programs even though attempts were being made to determine the effectiveness of the programs. A fourth conceptual inadequacy was that much of the research was conducted in the absence of an identifiable conceptual or theoretical framework.

The research documents revealed a number of technical inadequacies that were common throughout much of the reported research. These inadequacies related to design, criterion instruments, and manner in which the research was conducted and interpreted. A list of the most common technical inadequacies follows: (1) variables were poorly defined and controlled; (2) most of the data were descriptive and/or collections of opinions, attitudes, interests, and perceptions; (3) many criterion instruments were developed that purported to measure similar variables, and each one was used only once and that was in the investigation for which it was developed; (4) little evidence was provided concerning the validity and reliability of the criterion instruments; (5) many investigations involved poor sampling techniques; and (6) the results of the investigations were frequently over generalized. Many of these technical inadequacies, as well as the previously identified conceptual inadequacies, have also been identified by other reviewers of inservice teacher education literature and research (Cruickshank et al., 1979; Harty & Enochs, 1985; Nicholson et al., 1976; Yarger, 1982).

The research documents further revealed that there is apparently not a cadre of experienced researchers who are making a coordinated and sustained effort to determine how to plan, implement, and evaluate effective inservice teacher education programs. In fact, approximately 70 percent of the research, excluding reviews, was conducted by doctoral students. This situation does not account for the conceptual and technical inadequacies of the research, but it is without a doubt a major contributing factor.

Conclusion and Recommendations

It is not possible to conclude with certainty that implementing the 22 identified guidelines will result in more effective science teacher inservice education programs. The reasons for this uncertainty are fairly obvious. First, from an experimental inquiry perspective, the overall quality of the research described in the reviewed documents was poor. Second, few investigations dealt exclusively with science teacher inservice education. Third, the analytic procedure used in the review of giving each reported result equal weight regardless of sample size and degree of internal and external validity placed severe limitations on any conclusions that might be drawn. However, it would be counter productive to simply dismiss the large quantity of supporting evidence that does exist even if it is of low quality. In addition, the derived guidelines do reflect what most science educators would accept as sound educational practices. Consequently, the conclusion drawn from the analysis should be considered as a working hypothesis that is likely to be true. In other words, implementing the 22 derived guidelines would likely result in more effective science teacher inservice education programs. It is recommended that these guidelines be implemented and their effects on the quality of science teacher inservice education programs be evaluated.

As a result of the review, it is recommended that additional research be conducted on how to plan, implement, and evaluate effective inservice education programs for science teachers. Additional support is provided for the recommendation as a result of several investigations in which inservice education has been identified as one of the priorities for research in science education (Abraham et al., 1982; Butts et al., 1978; Gallagher & Yager, 1981; Yager, 1978; Yeany & Capie, 1978). However, researchers in science education should attend to the conceptual and technical inadequacies of the existing research before conducting additional research on science teacher inservice education programs. More research involving rigorous experimental inquiry needs to be conducted. It is crucial that the research be conducted within an identified theoretical framework. Definitions should be established. The objectives of the particular type of inservice education program or program activity should be agreed upon and specified. The validity and reliability of criterion instruments should be established. Although descriptions, perceptions, and opinions concerning inservice teacher education programs are important, more objective data are needed on whether or not participation in the programs results in changes in teacher performance in the classroom.

An intriguing example of the kind of conceptual framework in which research on science teacher inservice education should be conducted has recently been proposed by Fenstermacher and Berliner (1985). It was proposed as a conceptual framework for forward-looking evaluation of staff development activities. The primary intent was to provide assistance in determining whether a staff development activity was likely to be worthwhile, meritorious, and successful before the activity was implemented. It is recommended that this conceptual framework be used in future research on science teacher inservice education programs and activities. It is further recommended that the framework serve as a model and/or starting point for developing additional and more comprehensive conceptual frameworks encompassing every aspect of the science teacher inservice education enterprise.

Additional research involving experimental inquiry has been recommended because of the scarcity of rigorous experimental research on how to plan, implement, and evaluate effective inservice education programs. Only three of the investigations described in the 130 research documents could be realistically classified as experimental inquiry. The recommendation is not made under the pretense that such an approach has a high probability of resulting in definite answers concerning effective inservice education programs. In fact, additional experimental inquiry may reveal the paradigm to be inappropriate for determining how to plan, implement, and evaluate inservice teacher education programs, but such a position remains speculative until more research is conducted using experimental inquiry. At the same time, however, it is recommended that research be conducted using rigorous naturalistic inquiry. In the opinion of the author, the underlying assumptions of naturalistic inquiry as identified by Guba and Lincoln (1985) are more appropriate for research on how to plan, implement, and evaluate effective inservice teacher education than those underlying experimental inquiry. This position also remains speculative and further supports the recommendations of using rigorous experimental and naturalistic research paradigms to conduct additional research on inservice teacher education.

It is recommended that science educators cease the practice of relying almost exclusively on degree candidates for basic research on which the field depends. Twenty years have passed since Tyler (1966) pointed out this weakness in science education research, and it appears that little improvement has been made. Tyler's suggestion of establishing a cadre of experienced researchers in order to realize more of the potential value of research remains appropriate. A coordinated and sustained research effort is needed in the area of inservice teacher education, and it must be conducted with enough rigor to provide trust in the outcomes. A research effort such as this requires a cadre of experienced researchers to provide leadership and assistance. Unless this is accomplished, it seems unlikely that science education research will provide definite answers on how to plan, implement, and evaluate effective inservice education programs.

REFERENCES

Abraham, M. R., J. W. Renner, R. M. Grant & S. L. Westbrook. "Priorities for Research in Science Education: A Survey." Journal of Research in Science Teaching, 19 (8): 697-704, 1982.

Ainsworth, B. A. "Stated Perceptions of Teachers Regarding In-Service Programs." (Doctoral dissertation, University of Maryland, 1974). Dissertation Abstracts International, 36: 7163A, 1975. (University Microfilms No. 75-11, 215, 194).

Anderson, G. R. "A Study of In-Service Education in the Public Secondary Schools of Texas." (Doctoral dissertation, North Texas State University, 1975). Dissertation Abstracts International, 36: 5181A-5182A, 1976. (University Microfilms No. 76-4389, 141).

Ansari, S. I. K. "An Analysis of the Perceptions and Attitudes of Teachers, Principals, and Administrators, Regarding the Effectiveness of Inservice Education Programs, in Grades K-6, in Five Selected County School Systems in the State of Tennessee." (Doctoral dissertation, George Peabody College for Teachers, 1978). Dissertation Abstracts International, 39: 4610A, 1979. (University Microfilms No. 7902486, 101).

Auton, S., L. Deck & A Edgemon. "Staff Development for Secondary School Teachers." National Association of Secondary School Principals Bulletin, 66: (455), 116-120, 1982.

Babl, L. J. P. "The Value of Selected In-Service Experiences as Perceived by Tenured and Non-Tenured Teachers." (Doctoral dissertation, University of Northern Colorado, 1978). Dissertation Abstracts International, 39: 6410A-6411A, 1979. (University Microfilms No. 7910282, 67).

Berman, P. & M. W. McLaughlin. Federal programs supporting educational change. Santa Monica, CA.: Rand Corp., 1978. (ERIC Document Reproduction Service No. ED 159 289).

Bethel, L. J. "Tailoring Inservice Training in Science to Elementary Teachers' Needs." Phi Delta Kappan, 63: (6), 416, 1982.

Bieber, R. L. "A Study of Decision Making for Inservice Teacher Education." (Doctoral dissertation, Washington State University, 1978). Dissertation Abstracts International, 39: 4874A, 1979. (University Microfilms No. 7903555, 157).

Bigelow, E. B. "A Survey, Analysis, and Proposed Program of In-Service Education in Selected School Districts in Six Midwestern States." (Doctoral dissertation, University of South Dakota, 1969). Dissertation Abstracts International, 30: 3821A-3822A, 1970. (University Microfilms No. 70-5293, 261).

Binko, J. B. & G. A. Neubert. "An Inservice Educational Model: Teachers and Professors as Coequals." Journal of Teacher Education, 35: (6), 15-17, 1984.

Borgealt, A. J. "Teacher Perceptions of Inservice Education Activities: An Exploratory Study." (Doctoral dissertation, The University of Iowa, 1969). Dissertation Abstracts International, 30: 3822A, 1970. (University Microfilms No. 70-4335, 180).

Bowman, J. M. "In-Service Education Programs in the Junior High Schools of the North Central Association of Colleges and Secondary Schools." (Doctoral dissertation, Indiana University, 1971). Dissertation Abstracts International, 32: 4460A-4461A, 1972. (University Microfilms No. 72-6690, 166).

Boznango, M. M. "An Evaluation of Selected Title III Inservice Projects in Michigan as Perceived by Participating Teachers on Thirteen Variables." (Doctoral dissertation, Michigan State University, 1968). Dissertation Abstracts, 29: 3486A-3487A, 1969. (University Microfilms No. 69-5843, 152).

Brimm, J. L. & D. J. Tollett. "How Do Teachers Feel About In-Service Education?." Educational Leadership, 31: (6), 521-525, 1974.

Brownlee, J. E. "An Exploratory Case Study of the Implementation of a School-Based Inservice Program in Three Schools." (Doctoral dissertation, University of Pittsburgh, 1981). Dissertation Abstracts International, 42: 5083A, 1982. (University Microfilms No. DA8210616, 190).

Bunday, S. Y. O. "Teacher Attitudes and Behaviors as Related to One-Day In-Service Education." (Doctoral dissertation, University of Northern Colorado, 1978). Dissertation Abstracts International, 39: 4876A-4877A, 1979. (University Microfilms No. 7902812, 215).

Burrello, L. C. & T. Orbaugh. "Reducing the Discrepancy Between the Known and Unknown in Inservice Education." Phi Delta Kappan, 63: (6), 385-388, 1982.

Butts, D., W. Capie, E. Fuller, D. May, J. Okey, & R. Yeany. "Priorities for Research in Science Education: A Delphi Study." Journal of Research in Science Teaching, 15: (2), 109-114, 1978.

Cheatley, A. M. "Teacher In-Service and Professional Development in the Urban School Divisions of Metropolitan Winnipeg." (Doctoral dissertation, The University of North Dakota, 1977). Dissertation Abstracts International, 39: 38A-39A, 1978. (University Microfilms No. 7810321, 162).

Christensen, J. C. & P. J. Burke. "Principals and Teachers Assess Professional Development in Elementary Schools." *Phi Delta Kappan*, 63: (6), 417, 1982.

Clark, A. R. "A Teacher Evaluation of Selected Methods of In-Service Education." (Doctoral dissertation, The University of Oklahoma, 1970). *Dissertation Abstracts International*, 31: 2767A, 1970. (University Microfilms No. 70-23, 968, 139).

Combs, A. W. (Ed.). *Perceiving, behaving, becoming: A new focus for education*. Washington, D. C.: Association for Supervision and Curriculum Development, 1962.

Compton, R. S. "A Recommended Model Program of Orientation and Inservice Education for Beginning High School Teachers." (Doctoral dissertation, Miami University, 1977). *Dissertation Abstracts International*, 38: 2054A-2055A, 1977. (University Microfilms No. 77-20, 847, 173).

Cox, P. L. "Complementary Roles in Successful Change." *Educational Leadership*, 41: (3), 10-13, 1983.

Crandall, D. P. "The Teacher's Role in School Improvement." *Educational Leadership*, 41: (3), 6-9, 1983.

Cross, M. T. "Criteria for the Evaluation of In-Service Education." (Doctoral dissertation, Ball State University, 1977). *Dissertation Abstracts International*, 38: 1338A, 1977. (University Microfilms No. 77-18, 686, 189).

Cruickshank, D. R., L. Christopher, & L. Thompson. "What We Think We Know About Inservice Education." *Journal of Teacher Education*, 30: (1), 27-32, 1979.

Davis, J. E. "An Analysis of In-Service Education Based on Teachers' Perceptions of the Characteristics of Decision-Making Structures." (Doctoral dissertation, Columbia University Teachers College, 1976). *Dissertation Abstracts International*, 37: 1320A-1321A, 1976. (University Microfilms No. 76-20, 867, 241).

Davis, J. H. "A Study of the In-Service Education Program of Elementary School Teachers in Knoxville City Schools." (Doctoral dissertation, The University of Tennessee, 1977). *Dissertation Abstracts International*, 39: 3905A, 1978. (University Microfilms No. 77-27, 653, 106).

Dawani, K. S. "A Study of the Cooperative Development of an In-Service Education Program for Churchill Area School District." (Doctoral dissertation, University of Pittsburgh, 1972). *Dissertation Abstracts International*, 33: 6763A, 1973. (University Microfilms NO. 73-13, 231, 113).

DeGraaf, D. A. "A Strategy for Inservice Education of Junior-High/Middle-School Science Teachers in the Grand Rapids Public School System." (Doctoral dissertation, Western Michigan University, 1980). *Dissertation Abstracts International*, 41: 2044A, 1980. (University Microfilms No. 8025547, 150).

Divins Guerriero, B. J. "The Relationships Among Elementary Teachers' Inservice Preferences, Individualized Instruction, and Social Power Base." (Doctoral dissertation, West Virginia University, 1981). *Dissertation Abstracts International*, 42: 4408A, 1982. (University Microfilms No. DA8207506, 142).

Dreisbach, D. E. "A Survey of the Opinions of the Supervising Principals, Elementary Principals, and Elementary Teachers Concerning the In-Service Programs Conducted in the Joint School Systems of Berks County, Pennsylvania." (Doctoral dissertation, Temple University, 1959). *Dissertation Abstracts*, 20: 3202, 1960. (University Microfilms No., 59-6458, 231).

Duncan, B. M. "A Study of Factors Associated with the Successful Operation of In-Service Programs of Education in Selected Alabama Schools." (Doctoral dissertation, University of Alabama, 1964). *Dissertation Abstracts*, 25: 3989-3990, 1964. (University Microfilms No. 64-12, 771, 158).

Easom, M. P. "Factors Affecting the Impact of Inservice Education Programs on Teachers in Selected Georgia School Systems." (Doctoral dissertation, University of Georgia, 1981). *Dissertation Abstracts International*, 42: 3411A, 1982. (University Microfilms No. 8201532, 247).

Edwards, P. K. D. "Teachers' Perceptions of Present Practices, Process-Needs, Alternative Delivery Systems and Priority of Inservice Education." (Doctoral dissertation, The University of Michigan, 1975). *Dissertation Abstracts International*, 36: 3581A, 1975. (University Microfilms No. 75-29, 212, 323).

Ellis, B. J. "A Study of In-Service Education Programs in the New Hampshire Public Schools." (Doctoral dissertation, Boston University, 1975). *Dissertation Abstracts International*, 35: 5718A-5719A, 1975. (University Microfilms No. 75-5513, 184).

Esposito, J. P. "School-Based Staff Development: Collaborative Planning and Preparation for Change." (Doctoral dissertation, University of Massachusetts, 1981). *Dissertation Abstracts International*, 41: 5063A, 1981. (University Microfilms No. 8110325, 202).

Feinberg, M. W. "An Analysis of Guidelines for In-Service Teacher Education Practices in Selected Schools-Grades 5-9." (Doctoral dissertation, Northwestern University, 1974). Dissertation Abstracts International, 35: 3561A, 1974. (University Microfilms No. 74-28, 619, 208).

Fenstermacher, G. D. & D. C. Berliner. "Determining the Value of Staff Development." The Elementary School Journal, 85: (3), 281-314, 1985.

Fletcher, K. J. "Guidelines to Developing a Teacher Self-Evaluation Program with an Inservice Model." (Doctoral dissertation, Seattle University, 1979). Dissertation Abstracts International, 40: 3000A, 1979. (University Microfilms No. 7926218, 200).

Fukushima, M. J. "A Management Model for a Coordinated, General, and Individualized Staff Development Program." (Doctoral dissertation, University of La Verne, 1981). Dissertation Abstracts International, 42: 3956A-3957A, 1982. (University Microfilms No. DA8204176, 141).

Gallagher, J. J. & R. E. Yager. "Science Educators' Perceptions of Problems Facing Science Education: A Report of Five Surveys." Journal of Research in Science Teaching, 18: (6), 505-514, 1981.

Gardner, D. P. A Nation at Risk: The Imperative for Educational Reform. Washington, D. C.: U. S. Department of Education, 1983. (ERIC Document Reproduction Service No. ED 226 006).

Gerheim, M. F. "Teacher Evaluation of the Nature and Effectiveness of In-Service Teacher Education in Selected School Districts." (Doctoral dissertation, University of Pittsburgh, 1959). Dissertation Abstracts, 20: 4339-4340, 1960. (University Microfilms No. 60-1334, 303).

Glasford, R. E. "Teachers' Attitudes Toward Selected Components of In-Service Programs in the State of Iowa." (Doctoral dissertation, Drake University, 1980). Dissertation Abstracts International, 41: 4232A, 1981. (University Microfilms No. 8106947, 138).

Guba, E. G. & Y. S. Lincoln. Effective Evaluation: Improving the Usefulness of Evaluation Results Through Responsive and Naturalistic Approaches. San Francisco, Calif.: Jossey-Bass Publishers, 1985.

Harris, P. A. G. "Teacher Inservice Education in Public School Districts in Wisconsin." (Doctoral dissertation, The University of Wisconsin, 1982). Dissertation Abstracts International, 44: 143A, 1983. (University Microfilms No. DA8313233, 365).

Harty, H. & L. G. Enochs. "Toward Reshaping the Inservice Education of Science Teachers." School Science and Mathematics, 85: (2), 125-135, 1985.

Hassel, C. W. "A Study of Certain Factors Related to In-Service Education in Selected School Districts in New York State." (Doctoral dissertation, Syracuse University, 1960). Dissertation Abstracts, 21: 308-309, 1960. (University Microfilms No. 60-2603, 366).

Henson, C. M. "A Comparison of a Faculty Planned Inservice Program Versus a District Planned Inservice Program." (Doctoral dissertation, Saint Louis University, 1978). Dissertation Abstracts International, 39: 1224A-1225A, 1978. (University Microfilms No. 7814573, 123).

Hewitt, J. E. "The Perceptions of Michigan Public School Administrators Toward Selected Aspects of In-Service Education." (Doctoral dissertation, The University of Michigan, 1979). Disseration Abstracts International, 40: 803A-804A, 1979. (University Microfilms No. 7916723, 163).

Hodgson, N. C. "Attitudes of Teachers Toward Certain In-Service Training Activities." (Doctoral dissertation, The Ohio State University, 1954). Dissertation Abstracts, 20: 3203-3205, 1960. (University Microfilms No. 60-71, 220).

Holly, M. L. "A Conceptual Framework for Personal-Professional Growth: Implications for Inservice Education." (Doctoral dissertation, Michigan State University, 1977). Dissertation Abstracts International, 38: 2521A-2522A, 1977. (University Microfilms No. 77-25, 247, 266).

Horn, J. G. & M. A. Marsh. Elementary Science Curriculum Implementation: As It Was and As It Should Be. Vermillion, South Dakota: South Dakota University, 1976. (ERIC Document Reproduction Service No. ED 135 639).

Huberman, A. M. "School Improvement Strategies That Work: Some Scenarios." Educational Leadership, 41: (3), 23-27, 1983.

Hutson, H. M. "Inservice Best Practices: The Learning of General Education." Journal of Research and Development in Education, 14: (2), 1-10, 1981.

James, R. K. & G. Hall. "A Study of the Concerns of Science Teachers Regarding an Implementation of Iscs." Journal of Research in Science Teaching, 18: (6), 479-487, 1981.

Jamison, P. J. "The Development and Validation of a Conceptual Model and Quality Practices Designed to Guide the Planning, Implementation, and Evaluation of Inservice Education Programs." (Doctoral dissertation, University of Maryland, 1981). *Dissertation Abstracts International*, 42: 3566A, 1982. (University Microfilms No. 8202604, 239).

Jaquith, C. E. "An Analysis of Perceptions of Junior High/Middle School Teachers, Principals, and University Specialists Concerning Inservice Education."(Doctoral dissertation, The University of Michigan, 1973). *Dissertation Abstracts International*, 34: 1485A-1486A, 1973. (University Microfilms No. 73-24, 602, 253).

Joslin, P. A. "Inservice Teacher Education: A Meta-Analysis of the Research." (Doctoral dissertation, University of Minnesota, 1980). *Dissertation Abstracts International*, 41: 3058A, 1981. (University Microfilms No. 8102055, 242).

Joyce, B. & B. Showers. "Improving Inservice Training: The Message of Research." *Educational Leadership*, 37: (5), 379-385, 1980.

Joyce, B. R., K. M. McNair, R. Diaz, M. D. McKibbin, F. T. Waterman, & M. G. Baker. *Interviews: Perceptions of Professionals and Policy Makers*. Stanford, Calif.: Stanford University, Stanford Center for Research and Development in Teaching, 1976. (ERIC Document Reproduction Service No. ED 142 546).

Juris, A. P. "A Study of the In-Service Training Program of the Klamath County School District in Relation to a Model for Improvement." (Doctoral dissertation, Utah State University, 1973). *Dissertation Abstracts International*, 34: 7488A, 1974. (University Microfilms No. 74-13, 228, 70).

Kaz, S. E. "An Analysis of Teacher In-Service Education in an Urban School System." (Doctoral dissertation, Columbia University, 1971). *Dissertation Abstracts International*, 32: 3139A, 1971. (University Microfilms No. 72-1246, 217).

Keliher, E. C. "A Survey of In-Service Education Practices in Southeastern Michigan." (Doctoral dissertation, Wayne State University, 1972). *Dissertation Abstracts International*, 33: 2074A-2075A, 1972. (University Microfilms No. 72-28, 452, 191).

King, C. T. "A Survey of the In-Service Training Program in the Millburn School District from May 1, 1951 to February 15, 1957." (Doctoral dissertation, Rutgers University, 1957). *Dissertation Abstracts*, 18: 1731-1732, 1958. (University Microfilms No. 58-4914, 326).

King, I. B. "Relationship of Selected Instructional Elements and Changes in Stages of Teacher Concern Regarding Innovations." (Doctoral dissertation, University of Georgia, 1983). *Dissertation Abstracts International*, 44: 2343A, 1984. (University Microfilms No. DA8326408, 217).

King, J. C., P. C. Hayes, I. Newman. "Some Requirements for Successful Inservice Education." *Phi Delta Kappan*, 58: (9), 686-687, 1977.

Korinek, R. S., R. Schmid, & M. McAdams. "Inservice Types and Best Practices." *Journal of Research and Development in Education*, 18: (2), 33-38, 1985.

Larson, O. P. "A Study of In-Service Education in the School Divisions and Counties of Alberta." (Doctoral dissertation, University of Oregon, 1962). *Dissertation Abstracts*, 23: 4587-4588, 1963. (University Microfilms No. 63-3152, 247).

Lawrence, G. *Patterns of Effective Inservice Education. A State of the Art Summary of Research on Materials and Procedures for Changing Teacher Behaviors in Inservice Education.* Tallahassee, Florida: State Department of Education, Division of Elementary and Secondary Education, 1974. (ERIC Document Reproduction Service No. ED 176 424).

Lawrenz, F. P. "An Evaluation of the Effect of Two Different Lengths of Inservice Training on Teacher Attitudes." *Journal of Research in Science Teaching*, 21: (5), 497-506, 1984.

Little, J. W. "Norms of Collegiality and Experimentation: Workplace Conditions of School Success." *American Educational Research Journal*, 19: (3), 325-340, 1982.

Loucks, S. F. "At Last: Some Good News from a Study of School Improvement." *Educational Leadership*, 41: (3), 4-5, 1983.

Ludwig, R. A. "Effect of Multiple Sources of Input for Decisions Involving In-Service/Professional Renewal Processes." (Doctoral dissertation, The University of Akron, 1977). *Dissertation Abstracts International*, 38: 6443A, 1978. (University Microfilms No. 7804927, 222).

Mangieri, J. N. & D. R. McWilliams. "Designing an Effective Inservice Program." *Journal of Teacher Education*, 27: (2), 110-112, 1976.

Manriquez, N. H. "Inservice Teacher Education: School and Community Collaboration in Staff Development." (Doctoral dissertation, Stanford University, 1978). *Dissertation Abstracts International*, 39: 825A-826A, 1978. (University Microfilms No. 7814187, 181).

Marsh, C. R. "A Consensual Procedure to Identify Practices to Evaluate the In-Service Education Program in the Elementary Schools of Richland County School District One." (Doctoral dissertation, University of South Carolina, 1975). Dissertation Abstracts International, 36: 7102A, 1976. (University Microfilms No. 76-10, 504, 337).

Marshall, J. C., R. Maschek, & S. D. Caldwell. "How Stable are Teachers' Inservice Interests?" Phi Delta Kappan, 63: (6), 418, 1982.

Mazzarella, J. A. "Synthesis of Research on Staff Development." Educational Leadership, 38: (2), 182-185, 1980.

McClaron, L. C. "A Study of the Perceptions of Administrators and Teachers as They Relate to the Need for, and the Extent of Teacher Involvement in the Planning Process of Inservice Education." (Doctoral dissertation, George Peabody College for Teachers of Vanderbilt University, 1981). Dissertation Abstracts International, 42: 5092A, 1982. (University Microfilms No. DA8208465, 156).

McElhone, J. W. "A Study to Determine the Attitudes of Wyoming Teachers Toward Inservice Education." (Doctoral dissertation, University of Wyoming, 1979). Dissertation Abstracts International, 41: 633A-634A, 1980. (University Microfilms No. 8018013, 129).

McLaughlin, M. W. "Implementation as Mutual Adaptation: Change in Classroom Organization." Teachers College Record, 77: (3), 339-351, 1976.

McLaughlin, M. W. & D. D. Marsh. "Staff Development and School Change." Teachers College Record, 80: (1), 69-94, 1978.

McLendon, D. P. "A Delphi Study of Agreement and Consensus Among Selected Educator Groups in Texas Regarding Principles Underlying Effective Inservice Education." (Doctoral dissertation, The University of Texas at Austin, 1977). Dissertation Abstracts International, 38: 3855A, 1978. (University Microfilms No. 77-29, 066, 272).

Meadows, T. C. "The Effect of Selected Variables on Elementary Teachers' Ratings of Science In-Service Workshops." (Doctoral dissertation, The University of Texas at Austin, 1978). Dissertation Abstracts International, 39: 2199A, 1978. (University Microfilms No. 7817681, 182).

Medley, D. M. Teacher Competence and Teacher Effectiveness. A Review of Process-Product Research. Washington, D. C.: American Association of Colleges for Teacher Education, 1977. (ERIC Document Reproduction Service No. ED 143 629).

Melnick, Z. H. "Teachers' Perceptions of Inservice Education Programs in Tennessee Public Schools." (Doctoral dissertation, The University of Tennessee, 1981). Dissertation Abstracts International, 42: 3959A, 1982. (University Microfilms No. DA8203847, 186).

Miles, M. B. "Unraveling the Mystery of Institutionalization." Educational Leadership, 41: (3), 14-19, 1983.

Miller, E. D. "A Model for Designing Inservice Education Programs for Elementary School Teachers." (Doctoral dissertation, Ball State University, 1982). Dissertation Abstracts International, 43: 664A-665A, 1982. (University Microfilms No. DA8219441, 129).

Mitchell, E. R. "A Comparison of Two Approaches to Inservice Training and Subsequent Teaching Behavior and Attitudes." (Doctoral dissertation, University of Maryland, 1978). Dissertation Abstracts International, 40: 806A, 1979. (University Microfilms No. 7917387, 107).

Myers, D. D. "Guidelines for an In-Service Education Program Based on Staff Role Perceptions of Individual and Group Roles in Selected Curriculum Development Processes." (Doctoral dissertation, University of Virginia, 1971). Dissertation Abstracts International, 32: 4331A, 1972. (University Microfilms No. 72-7242, 182).

Nicholson, A. M., B. R. Joyce, D. W. Parker, & F. T. Waterman. The Literature on Inservice Teacher Education: An Analytic Review. Washington, D. C.: National Center for Education Statistics, Office of Education, 1976. (ERIC Document Reproduction Service No. ED 129 734).

Nonte, A. E. "Inservice Education Practices in Selected Small School Corporations and Recommended Guidelines for Establishment of Future Inservice Education Programs." (Doctoral dissertation, Indiana University, 1978). Dissertation Abstracts International, 39: 5462A-5463A, 1979. (University Microfilms No. 7906023, 94).

Nur, M. M. "Collaboration in Governance: A Federal Model of Inservice Teacher Education for Teachers and Community Members." (Doctoral dissertation, Stanford University, 1978). Dissertation Abstracts International, 39: 6714A, 1979. (University Microfilms No. 7905908, 243).

Orlich, D. C. & J. R. Ezell. "Evaluating the Efficacy of an Elementary Science Inservice Education Program." Science Education, 59: (1), 59-71, 1975.

Patton, W. E. & L. W. Anglin. "Characteristics of Success in High School Inservice Education." *The High School Journal*, 65: (5), 163-168, 1982.

Pease, J. M. "Effective Characteristics of Inservice Education Programs as Perceived by Maine Elementary School Classroom Teachers: A Delphi Study." (Doctoral dissertation, George Peabody College for Teachers of Vanderbilt University, 1984). *Dissertation Abstracts International*, 45: 1725A, 1984. (University Microfilms No. DA8419260, 115).

Peters, T. J. & R. H. Waterman. *In Search of Excellence: Lessons From America's Best-Run Companies*. New York: Harper and Row, Publishers, Inc., 1982.

Pickrel, G. E. "A Study of the In-Service Education Program in the Westside Community (Nebraska) Schools." (Doctoral dissertation, The University of Nebraska Teachers College, 1960). *Dissertation Abstracts*, 20: 4322-4323, 1960. (University Microfilms No. 60-1527, 196).

Purifoy, T. J. "In-Service Follow-Up: Impact on the Teaching Behavior of the Classroom Teacher." (Doctoral dissertation, The University of Texas at Austin, 1980). *Dissertation Abstracts International*, 41: 4684A, 1981. (University Microfilms No. 8109228, 152).

Robinson, E. J. "The Development of a Person-Oriented In-Service Teaching Model." (Doctoral dissertation, Claremont Graduate School, 1979). *Dissertation Abstracts International*, 39: 6622A, 1979. (University Microfilms No. 7911540, 249).

Savage, G. J. "A Comparison of Administrator-Teacher Perceptions of In-Service Education." (Doctoral dissertation, University of Illinois, 1967). *Dissertation Abstracts International*, 28: 2962A-2963A, 1968. (University Microfilms No. 68-1848, 81).

Schiffer, J. A. "A Model for Designing In-Service Staff Development Programs." (Doctoral dissertation, Columbia University Teachers College, 1977). *Dissertation Abstracts International*, 39: 60A-61A, 1977. (University Microfilms No. 77-14, 752, 302).

Schiller, B. T. "Variables Influencing the Effectiveness of Inservice Education for Educators." (Doctoral dissertation, The University of Michigan, 1979). *Dissertation Abstracts International*, 40: 5306A-5307A, 1980. (University Microfilms No. 8007828, 187).

Schneider, R. A. "The Development of a Theoretical Model for Inservice Training for Elementary School Teachers." (Doctoral dissertation, Indiana University, 1976). *Dissertation Abstracts International*, 39: 4846A-4847A, 1977. (University Microfilms No. 77-3368, 136).

Schoedinger, B. M. "The Effect of the Use of Identified Criteria for Effective In-Service Teacher Education and Teacher Attitude Toward In-Service Programs." (Doctoral dissertation, University of Idaho, 1977). *Dissertation Abstracts International*, 39: 595A, 1978. (University Microfilm No. 7813499, 74).

Sea, D. L. "A Study of Factors Concerning Inservice Programs Associated with Newer Elementary Curricula in Selected Minnesota Schools." (Doctoral dissertation, Oklahoma State University, 1973). *Dissertation Abstracts International*, 39: 6419A, 1974. (University Microfilms No. 74-8118, 189).

Smith, J. C. "An Assessment of the In-Service Education Program in Huntsville, Alabama Schools." (Doctoral dissertation, University of Alabama, 1971). *Dissertation Abstracts International*, 32: 4906A, 1972. (University Microfilms No. 72-8470, 276).

Smith, J. H. "The Relationships Between Specific Context Variables and Types of Inservice Education Preferred by Elementary Classroom Teachers." (Doctoral dissertation, University of Minnesota, 1984). *Dissertation Abstracts International*, 45: 3328A, 1985. (University Microfilms No. DA8501888, 188).

Spector, B. S. "Case Study of an Innovation Requiring Teachers to Change Roles." *Journal of Research in Science Teaching*, 21: (6), 563-574, 1984.

Spector, B. S. "Curricular Innovation and Teacher Role Change: An Exploratory Study." (Doctoral dissertation, Syracuse University, 1977). *Dissertation Abstracts International*, 39: 653A, 1978. (University Microfilms No. 7811681, 243).

Sutherby, R. R. "Participant Reaction to an Inter-Institutional Approach to In-Service Education: Genessee County Workshop." (Doctoral dissertation, Michigan State University, 1979). *Dissertation Abstracts International*, 40: 1850A-1851A, 1979. (University Microfilms No. 7921203, 147).

Syropoulos, M. *Evaluation of the Federally Assisted Staff Training (FAST) Projects*. Detroit, Michigan: Detroit Public Schools, 1972. (ERIC Document Reproduction Service No. ED 077 849).

Teague, W. "An Evaluative Analysis of the In-Service Program for Teachers and Administrators in Dekalb County, Georgia." (Doctoral dissertation, Auburn University, 1962). *Dissertation Abstracts*, 23: 3747, 1963. (University Microfilms No. 63-894, 227).

Thompson, S. R. "A Survey and Analysis of Pennsylvania Public School Personnel Perceptions of Staff Development Practices and Beliefs with a View to Identifying Some Critical Problems or Needs." (Doctoral dissertation, The Pennsylvania State University, 1982). *Dissertation Abstracts International*, 43: 768A, 1982. (University Microfilms No. DA8213352, 279).

Timms, A. F. "An Analysis of Classroom Teachers' Translations of the Ideas Gained from In-Service Experiences into Classroom Procedures." (Doctoral dissertation, University of Pittsburgh, 1975). *Dissertation Abstracts International*, 36: 2151A-2152A, 1975. (University Microfilms No. 75-22, 469, 243).

Townsend, K. S. G. "A Case Study of a Clinical Inservice Teacher Education Model." (Doctoral dissertation, University of Houston, 1979). *Dissertation Abstracts International*, 40: 1254A-1255A, 1979. (University Microfilms No. 7919405, 308).

Turner, I. S. "A Study of Teachers' Perceptions of an In-Service Program in Three Southern Maryland Counties." (Doctoral dissertation, The George Washington University, 1970). *Dissertation Abstracts International*, 31: 2780A, 1970. (University Microfilms No. 70-24, 967, 265).

Tyler, R. W. "Analysis of Strengths and Weaknesses in Current Research in Science Education." In J. S. Richardson & R. W. Howe (Eds.), *The Role of Centers for Science Education in the Production, Demonstration, and Dissemination of Research*. Columbus, Ohio: The Ohio State Research Foundation, 1966.

Underwood, B. & R. Underwood. "Concerns of Junior High School and Middle School Teachers: A Framework for In-Service Programs." The Clearing House, 51: (1), 36-37, 1977.

Urdang, M. S. "A Causal Model of Inservice Program Characteristics and Participant Attitudes." (Doctoral dissertation, Rutgers University, 1982). *Dissertation Abstracts International*, 43: 768A, 1982. (University Microfilms No. DA8218334, 110).

Vaughn, A. L. "Utilizing Instructional Staff Preferences of Selected In-Service Processes as a Source of Directives for In-Service Education Programs." (Doctoral dissertation, University of Virginia, 1975). *Dissertation Abstracts International*, 36: 4246A-4247A, 1976. (University Microfilms No. 76-1077, 211).

vonEschenbach J. F. "Effects of a Collaborative In-Service Model on Middle School Teachers' Perceptions of Their Professional Competence." *High School Journal*, 46: (1), 8-12, 1980.

Wade, R. K. "What Makes a Difference in Inservice Teacher Education: A Meta-Analysis of the Research." (Doctoral dissertation, University of Massachusetts, 1984). Dissertation Abstracts International, 45: 155A, 1984. (University Microfilms No. DA8410341, 236).

Weiner, B. Achievement, Motivation and Attribution Theory. Morristown, New Jersey: General Learning Press, 1974.

Wesner, G. E. "A Study of In-Service Education Programs for Secondary School Teachers in Selected Large-City Public School Systems." (Doctoral dissertation, University of Kansas, 1963). Dissertation Abstracts, 25: 5159, 1964. (University Microfilms No. 64-6823, 229).

White, M. A., C. E. Raun, & D. Butts. A Study of Contrasting Patterns in Inservice Education. Austin, Texas: Austin Science Education Center, Texas University, 1967. (ERIC Document Reproduction Service No. ED 021-807).

Wilen, W. W. & R. Kindsvatter. "Implications of Research for Effective In-Service Education." The Clearing House, 51: (7), 392-396, 1978.

Winger, H. D. "Orientation and In-Service Education of Teachers in Second and Third Class School Systems of Pennsylvania." (Doctoral dissertation, The Pennsylvania State University, 1959). Dissertation Abstracts, 20: 1664, 1959. (University Microfilms No. 59-5133, 110).

Withall, J. & F. H. Wood. "Taking the Threat Out of Classroom Observation and Feedback." Journal of Teacher Education, 30: (1), 55-58, 1979.

Withall, J. & W. D. Wood. "Change Processes." In H. E. Mitzel (Ed.), Encyclopedia of Educational Research (5th ed., Vol. 1). New York: The Free Press, 1982.

Wood, F. H. & S. R. Thompson. "Guidelines for Better Staff Development." Educational Leadership, 37: (5), 374-378, 1980.

Wright, H. D. "The Effects of Selected Incentives Upon Evaluations of In-Service Programs." (Doctoral dissertation, The University of Akron, 1977). Dissertation Abstracts International, 38: 3876A, 1978. (University Microfilms No. 77-29, 598, 1467).

Yager, R. E. "Priorities for Research in Science Education: A Study Committee Report." Journal of Research in Science Teaching, 15: (2), 99-107, 1978.

Yarger, G. P., M. B. Brannigan & S. L. Mintz. "Teacher Preferences Shape Inservice Courses." Phi Delta Kappan, 61: (10), 716-717, 1980.

Yarger, S. J. "In-Service Teacher Education." In H. E. Mitzel (Ed.), Encyclopedia of Educational Research (5th ed., Vol. 2). New York: The Free Press, 1982.

Yeany, R. H. & W. R. Capie. "A Factor-Analytical Study of the Research Priorities of Science Educators." Journal of Research in Science Teaching, 15: (2), 167-172, 1978.

York, H. E. "A Study of Teacher In-Service Education Programs in the Fairfax County, Virginia, School System for the School Year 1964-1965." (Doctoral dissertation, The George Washington University, 1966). Dissertation Abstracts, 27: 2930A-2931A, 1967. (University Microfilms No. 67-144, 201).

Zigarmi, P., L. Betz, & D. Jensen. "Teachers' Preferences in and Perceptions of In-Service Education." Educational Leadership, 34: (7), 545-551, 1977.

Table 2-1. Research Documents Relating to Each Guideline for Effective Inservice Education Programs

	Guidelines[a]																		
Research Documents	1	2	3	4	5	6	7/8	9	10	11/12	13/14	15	16	17	18	19	20	21	22
Ainsworth, 1974	X			X		X				X	X					X			
Anderson, 1975	X																		
Ansari, 1978	X									X	X	X							
Auton et al., 1982		X		X		X				X	X		X		X	X			
Babl, 1978	X			X		X		X		X	X								
Berman & McLaughlin, 1978	X	X	X	X	X	X		X		X	X	X	X		X	X	X	X	
Bethel, 1982				X															
Bieber, 1978	X	X	X	X		X				X	X								
Bigelow, 1969	X		X		X					X	X								X
Binko & Neubert, 1984	X																		
Borgealt, 1969	X					X													
Bowman, 1971	X					X				X	X								
Boznango, 1968	X							X											
Brimm & Tollett, 1974	X	X	X	X		X		X	X	X	X		X				X		
Brownlee, 1981	X			X							X								
Bunday, 1978					X														

Table 2-1 (continued)

Research Documents	1	2	3	4	5	6	7/8	9	10	11/12	13/14	15	16	17	18	19	20	21	22
	Guidelines[a]																		
Burrello & Orbaugh, 1982	X	X		X	X	X			X	X	X		X	X			X	X	X
Cheatley, 1977	X					X													
Christensen & Burke, 1982	X																		
Clark, 1970	X			X															
Compton, 1977	X					X							X		X				
Cox, 1983		X			X					X	X		X				X		
Crandall, 1983					X					X	X		X				X		
Cross, 1977																			X
Davis, 1976	X																		
Davis, 1977						X													
Dawani, 1972	X		X																
DeGraaf, 1980				X		X				X	X		X						
Divins, 1981											X								
Dreisbach, 1959	X							X		X									
Duncan, 1964	X				X	X			X		X								X
Easom, 1981	X			X	X	X				X	X								
Edwards, 1975	X			X		X									X	X			

Table 2-1 (continued)

Research Documents	Guidelines[a]																		
	1	2	3	4	5	6	7/8	9	10	11/12	13/14	15	16	17	18	19	20	21	22
Ellis, 1975			X	X		X			X										X
Esposito, 1981	X			X		X							X		X				
Feinberg, 1974	X		X	X						X									X
Fletcher, 1979	X		X	X	X	X		X							X		X		X
Fukushima, 1981	X	X									X				X				
Gerheim, 1959	X	X				X				X	X		X		X				
Glasford, 1980	X			X															
Harris, 1982	X			X		X					X								X
Hassel, 1960	X		X	X						X	X				X	X			X
Henson, 1978				X															
Hewitt, 1979	X									X	X								
Hodgson, 1954	X			X		X		X	X				X			X			
Holly, 1977	X			X		X		X		X	X				X	X			
Horn & Marsh, 1976										X	X	X					X		
Huberman, 1983					X					X	X		X				X		
Hutson, 1981	X	X	X	X	X	X		X	X	X	X		X	X	X	X		X	X
James & Hall, 1981				X	X						X								

Table 2-1 (continued)

Research Documents	1	2	3	4	5	6	7/8	9	10	11/12	13/14	15	16	17	18	19	20	21	22
	Guidelines[a]																		
Jamison, 1981	X	X	X	X	X	X				X	X		X		X		X		X
Jaquith, 1973	X												X						
Joslin, 1980		X		X		X			X				X						
Joyce et al., 1976	X	X								X	X								X
Joyce & Showers, 1980							X		X										
Juris, 1973		X																	
Kaz, 1971	X			X							X					X			X
Keliher, 1972				X							X		X						
King, 1957	X		X	X	X				X										X
King, 1983				X															
King et al., 1977	X	X	X	X	X			X		X	X							X	X
Korinek et al., 1985	X		X	X	X	X	X	X	X	X	X		X						X
Larson, 1962	X			X									X						
Lawrence, 1974	X			X	X	X	X	X	X				X		X				
Lawrenz, 1984					X														
Little, 1982	X										X	X							
Loucks, 1983		X			X					X	X		X				X		

Table 2-1 (continued)

Research Documents	Guidelines[a]																		
	1	2	3	4	5	6	7/8	9	10	11/12	13/14	15	16	17	18	19	20	21	22
Ludwig, 1977	X																		
Mangieri & McWilliams, 1976	X			X		X													
Manriquez, 1978	X																		
Marsh, 1960	X															X			
Marsh, 1975	X					X													X
Marshall et al., 1982				X															
Mazzarella, 1980	X			X	X	X	X				X	X	X		X		X		
McClaron, 1981	X																		
McElhone, 1979	X			X	X	X				X	X		X						
McLaughlin, 1976	X		X	X	X	X		X		X	X	X	X		X	X	X	X	
McLaughlin & Marsh, 1978	X		X	X	X	X		X		X	X	X	X		X	X	X	X	
McLenson, 1977	X	X	X	X	X	X	X		X	X	X		X		X				X
Meadows, 1978				X															
Medley, 1977									X										
Melnick, 1981	X	X				X			X	X	X				X				X
Miles, 1983					X					X	X		X				X		
Miller, 1982	X			X							X								X

Table 2-1 (continued)

Research Documents	1	2	3	4	5	6	7/8	9	10	11/12	13/14	15	16	17	18	19	20	21	22
	Guidelines[a]																		
Mitchell, 1978																	X		
Myers, 1971	X		X																
Nonte, 1978	X			X	X	X			X	X	X	X	X		X				X
Nur, 1978	X																		
Orlich & Ezell, 1975				X															
Patton & Anglin, 1982	X			X										X					
Pease, 1984				X															
Peters & Waterman, 1982	X							X								X			
Pickrel, 1960	X									X	X						X		X
Purifoy, 1980																	X		
Robinson, 1979																X			X
Savage, 1967	X																		
Schiffer, 1977				X	X	X				X									
Schiller, 1979				X							X								
Schneider, 1976	X			X	X					X									
Schoedinger, 1977	X			X											X				
Sea, 1973													X						

Table 2-1 (continued)

Research Documents	1	2	3	4	5	6	7/8	9	10	11/12	13/14	15	16	17	18	19	20	21	22
Smith, 1971	X	X	X	X	X	X			X	X	X				X	X			X
Smith, 1984	X		X	X		X				X			X		X	X			
Spector, 1977															X				
Spector, 1984																X			
Sutherby, 1979	X										X								X
Syropoulos, 1972										X		X			X		X		
Teague, 1962	X		X	X	X	X		X		X	X		X		X				
Thompson, 1982	X	X	X	X	X	X		X		X	X	X			X	X	X		
Timms, 1975	X			X						X							X		
Townsend, 1979	X			X							X								
Turner, 1970				X		X									X	X			
Underwood & Underwood, 1977						X													
Urdang, 1982	X			X				X		X									
Vaughn, 1975	X	X	X	X	X	X													
vonEschenback, 1980	X			X															
Wade, 1984			X	X	X	X	X	X	X	X			X		X				
Weiner, 1974	X																		

(Columns 1–22 are headed "Guidelines[a]".)

Table 2-1 (continued)

Research Documents	1	2	3	4	5	6	7/8	9	10	11/12	13/14	15	16	17	18	19	20	21	22
	Guidelines[a]																		
Wesner, 1963				X		X				X	X		X						
White et al., 1967										X	X								
Wilen & Kindsvatter, 1978	X		X	X	X	X			X	X	X						X		X
Winger, 1959				X					X		X								X
Withall & Wood, 1982	X														X	X			
Withall & Wood, 1979	X														X	X			
Wood & Thompson, 1980								X							X	X			
Wright, 1977										X									
Yarger et al., 1980				X		X				X									
Yarger, 1982	X			X	X	X	X		X		X				X				
York, 1966				X		X				X			X		X				X
Zigarmi et al., 1977	X			X	X	X		X		X	X		X				X		
Totals	84	20	25	70	36	52	7	21	20	53	57	10	35	3	33	22	22	6	28

Note. Total research documents = 130.

[a] The number assigned to each guideline corresponds to the numbered guidelines within the text. An "X" under a guideline and opposite a research document indicates that the research document was used in deriving the guideline.

Chapter 3

ASSESSING TEACHERS' NEEDS FOR INSERVICE

David R. Stronck

This chapter contrasts one direct and one indirect approach to assessing science teachers' needs for inservice education. The report of the British Columbia Science Assessment Program presented herein exemplifies a direct approach in which elementary and secondary teachers' perceptions of their own needs for inservice were collected by written survey. The description of the process being used in California illustrates an indirect approach to determining inservice needs, in which teachers needs are inferred by others from their students' performance on statewide achievement tests in science.

Background

Lieberman (1985, p. 103) described some problems with the common system of contract provisions that pay teachers for additional training:

> Under such salary schedules, teachers are interested in being paid more, not in improving their performance. Thus they will tend to choose graduate courses that are conveniently scheduled, inexpensive, and not intellectually demanding rather than other activities that could contribute more to improving their professional performance. The unpleasant but inescapable reality is that U.S. school districts spend billions of dollars every year for additional training that is of no use to teachers.

Most teachers are seriously interested in participating in an effective inservice program for their professional development. The common failure of many training programs is the lack of involvement of teachers themselves in the organization of the programs. Lawrence (1974) concluded from his analysis of many research studies that the teachers should be actively involved in initiating, planning, and conducting the programs. Following Lawrence's recommendation, school districts should begin with an analysis of the teachers' perceptions of needs. The teachers should be involved in planning and conducting an inservice program to meet their perceived needs.

The British Columbia Science Assessment

An excellent example of assessing the needs of science teachers is the Science Assessment program by the Ministry of Education in the Province of British Columbia, Canada. Hobbs and his colleagues (1978) reported that the achievements of students in the public schools of British Columbia were similar to those of American students in comparable grades. Most of the textbooks used in British Columbia were originally published in the United States. Because of these and many other similarities between the standards and practices of British Columbians and those of Americans, recommendations for improving inservice programs in this Canadian province have relevancy for programs in the United States.

In 1982 the second British Columbia Science Assessment (Taylor, 1982) collected data from two questionnaires: one for teachers of elementary-school science and another for secondary-school teachers of science. The total population of 9,991 elementary-school teachers of science in grades one through seven excluded all teachers who were in administrative positions (except department heads) or who had completed a questionnaire during the same year for the Science Council of Canada. The policy of Ministry of Education is to ask teachers in this province to complete no more than one major questionnaire each year. One sixth of the schools were randomly selected to produce a sample of 1,614 teachers. Eighty-two percent (1,322 teachers) of the sample anonymously returned the questionnaire. For the 1978 Science Assessment of the same province, the return rate was 83%; 2,108 teachers completed the questionnaire from a population of slightly more than 10,000 elementary teachers.

In British Columbia, the junior-secondary grades are 8, 9, and 10 while the senior-secondary grades are 11 and 12. In 1982, the questionnaire for secondary teachers of science was completed anonymously by 529 teachers (309 junior-secondary and 220 senior-secondary). The return rate was 77.5%. Excluded from the sample were the 580 teachers who answered the questionnaire of the Science Education Study for the Science Council of Canada. In 1978, 932 junior-secondary teachers completed the questionnaire for a return rate of 85%; 477 senior-secondary teachers did not questionnaire for a return rate of 94%.

Data from the Questionnaires

Many of the elementary teachers in British Columbia have had few or no courses to prepare them for teaching science. In 1982, approximately one-fifth of the sampled teachers had no methods course in science teaching. Twenty-three percent reported having no university science courses while 49% had two or more courses (Taylor, 1982).

Although many elementary teachers had poor preparation, only 5% felt "not at all prepared to teach science," 22% of those with two or more courses still felt "less than adequate," strangely, 46% of those untrained in science teaching felt "adequate"! Apparently they did not even recognize their own weaknesses.

In 1982, 37% of all elementary teachers felt somewhat prepared; 46% felt adequately prepared; and 12% described themselves as more than adequately prepared for teaching science. Sieben and Hobbs (1979) reported that four years earlier a similar population of teachers in the same province had only 29% feeling adequately prepared and 3% describing themselves as very adequately prepared. Between these four years there were many inservice programs. In the same year of 1978, Weiss observed that only 22% of American elementary-school teachers felt qualified to teach science.

Among the secondary science teachers of British Columbia, almost all felt at least adequately prepared. In 1982, 44% described themselves as adequately prepared; 53%, more than adequately prepared; 4%, only somewhat prepared; none, as not at all prepared. Many specialists in science education would question such optimistic perceptions because 9% never successfully completed a post-secondary course in methods of teaching science and 45% had their science teaching methods course more than eleven years earlier.

The questionnaires asked the teachers to indicate the amount of inservice education they felt was required "this year" to do a good job of teaching science. In 1982, 20% of the elementary teachers and 29% of the secondary teachers felt no need for any inservice work. Nevertheless, 48% of both the elementary and the secondary teachers recognized a need for at least several sessions of workshops. Approximately the same percentages were reported in 1978 by teachers wanting extensive inservice help. Others felt a lesser need for inservice training.

Which inservice experiences would be the most effective? Table 3-1 lists twelve inservice methods ranked by the elementary teachers in 1978 and 1982. The Spearman Rank Order method gave a coefficient of correlation between the rankings of 1978 and those of 1982 at 0.93. Best (1959) describes this as a very high correlation. It can be interpreted as demonstrating a very high reliability for the questionnaire item. The population of elementary teachers between 1978 and 1982 had few changes in terms of their science teaching. There was a highly significant increase in the percentages of those experiencing various types of inservice programs. Table 1 describes these changes. The four most preferred forms of inservice had the common likelihood of involving teachers actively in initiating, planning and conducting the programs, i.e., workshops presented by other teachers, workshops presented by district personnel, informal meetings with other science teachers, and visits to other classrooms.

Table 3-2 provides the various inservice methods ranked by the junior-secondary science teachers. The coefficient of correlation between the rankings of 1978 and those of 1982 is 0.83; this is a high correlation (Best, 1959). During these four years there was a dramatic increase in the percentages of teachers experiencing different types of inservice programs. The increase in age and experience of the teachers provides the most probable explanation for the changes in rankings. In 1982 the teachers ranked much higher "university credit courses in science content" and much lower "informal meetings with university science education instructors." Apparently the more mature teachers felt less need for coaching in methodology and greater need for understanding scientific concepts. There seems to be an emerging recognition of a need to present updated and correct information about the advances of science. In 1982, the coefficient of correlation between the rankings by the elementary-school teachers and those by the junior-secondary teachers was 0.71 which is substantial. Again the data support the conclusion of Lawrence (1974) whose meta-analysis of 59 quantitative reports demonstrated the importance of involving teachers to achieve the objectives of inservice programs.

Table 3-1. Inservice Methods Ranked by Median Value of Elementary Teachers' Ratings in 1978 and 1982

Inservice Method Rated on a Three-Point Scale from 1 (Little Value) to 3 (Much Value)	1978		1982		
	Rank	Percent Without Experience	Rank	Percent Without Experience	Median
Workshops Presented by Other Teachers	1	39	1	16	2.30
Workshops Presented by District Personnel	Not Listed		1.5	30	2.26
Informal Meetings with Other Science Teachers	2	52	3	28	2.21
Visits to Other Classrooms	3	72	2	32	2.23
Annual Conferences for Science Teachers	Not Listed		4.5	71	2.15
Workshops Presented by University Science Educators	4	71	5	45	1.95
University Credit Courses in Science Methods	5	69	6	30	1.90
University Credit Courses in Science Content	6	69	4	29	1.96
Informal Meetings with University Science Educators	7	86	7	61	1.66
Informal Meetings with Scientists	8	91	8	78	1.70
Workshops Presented by Scientists	9	96	7	79	1.80
Workshops Presented by Ministry of Education Officials	10	97	10	85	1.53

Table 3-2. Inservice Methods Ranked by Median Value of Junior Secondary Teachers' Ratings in 1978 and 1982

Inservice Method Rated on a Three-Point Scale from 1 (Little Value) to 3 (Much Value)	1978		1982		
	Rank	Percent Without Experience	Rank	Percent Without Experience	Median
Informal Meetings with Other Science Teachers	1	15	1	1	2.39
Annual Conferences for Science Teachers	Not Listed		1.5	24	2.36
Workshops Presented by Other Teachers	2	34	4	12	2.16
Visits to Other Classrooms	3	59	3	20	2.20
Workshops Presented by University Science Educators	4	59	5	23	2.14
University Credit Courses in Science Content	5	65	2	18	2.26
Informal Meetings with University Science Education Instructors	6	69	9	39	1.61
University Credit Courses in Science Methods	8	72	6	25	1.89
Workshops Presented by District Resource Persons	Not Listed		6.5	37	1.87
Workshops Presented by Scientists	8	79	7	49	1.84
Informal Meetings with Scientists	8	79	8	50	1.83
Workshops Presented by Ministry of Education Officials	10	91	10	67	1.42

Table 3-3 gives the inservice methods ranked by the senior-secondary teachers. The coefficient of correlation between the rankings of 1978 and those of 1982 is 0.71, which is substantial. The teachers in 1982 had much greater experience in the variety of inservice methods than the teachers of 1978. The greatest changes in rankings over the four years followed the same pattern as the changes made by the junior-secondary science teachers. The coefficient of correlation between the rankings of the junior-secondary teachers and those of the senior-secondary teachers in 1982 was 0.84, which is high. The senior-secondary teachers gave higher rankings to informal meetings with university science educators, with scientists, and with other science teachers; university credit courses in science content; annual conferences for science teachers; and workshops presented by the Ministry of Education officials, and scientists. The junior-secondary science teachers gave higher rankings to university credit courses in science methods and workshops presented by other teachers and university science educators. These preferences indicate greater concern for methodology among the junior-secondary teachers, and greater interest in scientific content by the senior-secondary teachers.

Recommendations of the B. C. Assessment

The 1982 British Columbia Science Assessment gave the highest priority to the following recommendation (Taylor, 1982):

> That the Program Implementation Branch of the Ministry of Education coordinate the design, development and delivery of inservice programs which will focus on the following areas of need:
>
> °How to teach science processes and critical thinking skills;
>
> °The development of an adequate background of science knowledge in areas stressed in the curriculum, in areas of weakness for elementary teachers, and in the physical and earth/space sciences for junior secondary teachers;
>
> °How to safely teach science;
>
> °How to teach safety to pupils.

These recommendations were based primarily on the interpretation panels' rating of the performances of students on the achievement tests. In 1982, achievement tests of the British Columbia Science Assessment were completed by a sample of 27,944 students in grade 4; 29,699 students in grade 8, and 22,110 students in grade 12. The total sample was 79,753 students. These samples were 76% of all fourth graders, 74% of all eighth graders, and approximately 61% of

Table 3. Inservice Methods Ranked by Median Value of Senior Secondary Science Teachers' Ratings in 1978 and 1982

Inservice Method Rated on a Three-Point Scale from 1 (Little Value) to 3 (Much Value)	1978		1982		
	Rank	Percent Without Experience	Rank	Percent Without Experience	Median
Informal Meetings with Other Science Teachers	1	9	1	1	2.68
Workshops Presented by Other Teachers	2	24	3	5	2.09
Visits to Other Classrooms	3	50	4	17	2.07
Informal Meetings with University Science Educators	4	52	8	20	1.86
Workshops Presented by University Science Educators	5	48	7	9	1.88
University Credit Courses in Science Content	6	61	2	12	2.42
Annual Conferences for Science Teachers	Not Listed		2.5	10	2.38
Informal Meetings with Scientists	7	67	6	37	2.05
Workshops Presented by Scientists	8	71	5	37	1.84
Workshops Presented by District Resource Persons	Not Listed		5.5	34	1.86
University Credit Courses in Science Methods	9	71	9	16	1.80
Workshops Presented by Ministry of Education Officials	10	84	10	45	1.59

77

all students in grade 12. The interpretation panels consisted of 14 educators for grade 4; 15 for grade 8, and 14 for grade 12. Each of the tests had many items on science processes, knowledge, and higher level thinking.

The recommendation places great emphasis on laboratory safety. Because many surveys and tests in North America ignore this topic, the strong emphasis may seem unusual. It is based on the teachers' requests through the interpretation panels to include such items in the achievement tests for students. Rice (1981) explains that the need for more safety education may be much greater in the United States than many administrators realize and that science teachers worry more about classroom safety today than they did ten years ago.

The British Columbia recommendations concur with many of the recommendations found in the position statement of the National Science Teachers Association (1982) "Science-Technology-Society: Science Education for the 1980's." The NSTA urged laboratory and field activities to develop inquiry skills at the elementary and middle/junior high school levels and to develop problem solving throughout the secondary level. Certainly this stress on the laboratory and field activities implies the need for using safe procedures. The NSTA position statement and the British Columbia recommendations emphasized the need for teaching process skills and higher level thinking as well as scientific concepts. Both groups also recommended increased consideration of the physical and earth/space science in the junior high schools.

The NSTA position statement also recommends a significant increase of instruction on science-related social issues. Although the 1982 B. C. Science Assessment omitted consideration of this topic, the Junior Secondary Science Curriculum Guide and Resource Book (B. C. Ministry of Education, 1983) gives an organization of topics emphasizing "the application of science in the solution of practical problems and clarification of issues that involve science." The book has the potential of making science teachers in British Columbia leaders in implementing science-related social issues into the curriculum.

The British Columbia Science Assessment of 1978 recommended greatly increasing inservice programs for science teachers. The responses of the teachers to the questionnaires of the 1982 B. C. Science Assessment indicate that there were great increases in providing programs to science teachers. The Ministry of Education had a logical sequence of assessing needs and then providing inservice programs to meet these needs through the Program Implementation Branch of the Ministry of Education. Unfortunately, shortly after the completion of the 1982 Science Assessment, the government of the province drastically reduced its funding of inservice programs. British Columbia provides an example of excellent assessment of needs without adequate inservice programs. A common problem in the United States is inadequate assessment of needs resulting in relatively useless inservice programs. If a school district wishes to use the questionnaire developed for the British Columbia Science Assessment, Figure 1 is an adaptation of those items. These items are recommended especially because they include many forms of inservice that are usually omitted from questionnaires. Many school districts provide questionnaires with only a few options, often omitting what are clearly the most popular forms. A recognition of the full spectrum of potential inservice programs will greatly improve current practices.

Inservice Assessment in a Climate of Measurement-Driven Instruction

The recommendation for inservice programs of the B. C. Science Assessment emerged from the responses to questionnaires by large samples of science teachers throughout the province. Unfortunately, such questionnaires are not commonly used. Instead, the trend at state levels is to use indirect indicators to determine teachers' inservice needs. Those who examine the results of students' performance on statewide achievement tests may infer that deficiencies in student achievement reflect teacher deficiencies and subsequent needs for inservice education. In essence, the large curriculum committees that represent teachers and determine state frameworks upon which statewide student testing is based may indirectly determine inservice activities. For example, in recent years the state of California has taken major steps toward improving the quality of science instruction in the schools. In May of 1986, for the first time, students throughout the state will be taking a science test of the California Assessment Program (CAP). Before this test for eighth-grade students was compiled, the consultants recognized the need for defining the appropriate content of science courses. The product of this effort was The Science Framework Addendum for California Public Schools: Kindergarten and Grades One Through Twelve prepared by the Science Curriculum Framework and Criteria Committee in 1984. There were three classroom science teachers and three university professors of science education on this committee of fourteen members. The other eight members were curriculum specialists in school districts. Although this committee provided excellent insights into the most appropriate goals of science education, it worked without the benefit of assessing the opinions and needs of most of the science teachers in this state.

The California plan for improving science education centers on the use of the CAP tests. First, eighth-grade students will be tested. A few years later, there will be science tests for all students in grades six and ten. Achievements on these tests will demonstrate compliance with the curriculum presented in the Science Framework Addendum. Each district will receive a detailed analysis of students' achievements comparing scores in the district with statewide averages on forty-two

Put a "X" in the space describing your need for each topic:

	No Need 0	Little Need 1	Some Need 2	Strong Need 3
I. Content Areas				
A. Biological Science				
1. Cells				
2. Plants				
3. Protists				
4. Animals				
5. Human Beings				
6. Ecosystems				
7. Genetics				
8. Evolution				
B. Earth Science				
1. Astronomy				
2. Geology and natural resources				
3. Meteorology				
4. Oceanography				
C. Physical Science				
1. Matter				
2. Mechanics				
3. Energy				
a. Sources and transformations				
b. Heat				
c. Light				
d. Electricity and magnetism				
e. Sound				
D. Science, Technology, Individuals and Society				
1. Processes and products of science				
2. Interrelationships among sci., tech. and soc.				
3. Careers related to science and tech.				
E. Manipulative Skills and Safety				
1. Laboratory Safety				
2. Laboratory Methods				
II. Process Skills				
A. Observing				
B. Comparing				
C. Organizing				
D. Relating				
1. Using space-time relationships				
2. Formulating experimental hypotheses				
3. Experimenting				
E. Inferring				
1. Interpreting; formulating models/ theories				
2. Recognizing and predicting patterns				
F. Applying				

Figure 3-1. Questionnaire on content areas needing in-service assistance from the list of areas described in the list of areas described in the California Science Framework Addendum and used in reporting achievements on the 1985 eighth-grade science test of the California Assessment Program

categories. The two major categories are "scientific knowledge and concepts" and "science processes." Under "scientific knowledge and concepts" are five categories, e.g., "biological sciences." The eighth sub-category under "biological sciences" is "evolution."

Popham, Cruse, Rankin, Sandifer, and Williams (1985) observed: "Legislatures installed competency testing programs to force educators to produce tangible evidence that students had actually mastered basic skills." (p. 629) They also explained that the public believed too many students were being promoted for "seat-time" rather than for their academic accomplishments. They concluded: "When historians look back on the competency testing programs in Texas, Detroit, South Carolina, and Maryland, they will find solid evidence that measurement-driven instruction can work." (p. 634)

Cuban (1984) expressed serious doubts about the wisdom of measurement-driven instruction. Yes, teachers under pressure from their districts can achieve higher test scores from their students. Researchers have observed that such teachers cover content swiftly by lecturing for two-thirds of the time to the assembled class, by asking most of the questions, and by relying on the textbook as the sole course of information. Cuban (1984, p. 214) warns us: "Researchers also know that for students to cultivate critical thought, they need to ask questions often and freely, become actively involved for long periods with problems that make sense to them, and engage in activities in which the teacher plays the role of coach."

Testing programs can be very helpful in districts that use the data for staff development. The problem is to make this transition from knowledge about students' achievements to improved classroom instruction. The content frameworks upon which the tests were built could be used by staff developers to generate questionnaires to directly assess teachers' perceptions of their own needs in various content areas. A sample of such a questionnaire is in figure 2. Bill Honig (1985), superintendent of public instruction for the State of California, well understands the risks involved in attempting reforms through statewide tests: "A lack of common vision produces educational anarchy; too tight a definition of operating standards leads to bureaucratic ossification. We need to strike a proper balance between the two extremes." (p. 680)

The trend in the mid-1980s is toward a wider administration of state-mandated tests with the intention of changing the quality of instruction through reflection on these scores. This increased testing is coming shortly after the publication of numerous national reports on the nation's crisis in science education. Many have observed that we have certainly heightened our recognition of the problems. But have we simultaneously provided adequate solutions?

Based on your previous experience with inservice programs, indicate your preferences by checking the appropriate column for each types.

	Have Not Experienced	Have Experienced		
		Little Value	Moderate Value	Much Value
1. Annual conferences for science teachers				
2. Informal meetings with other science teachers				
3. Informal meetings with scientists				
4. Informal meetings with university science education instructors				
5. University credit courses in science content				
6. University credit courses in science methods				
7. Visits to other classrooms				
8. Workshops presented by a district resource person				
9. Workshops presented by other teachers				
10. Workshops presented by scientists				
11. Workshops presented by state department of education officials				
12. Workshops presented by university science educators				
13. Other (specify): ____________________ ____________________ ____________________				

Figure 3-2. A Questionnaire on Inservice Programs

Funding Inservice Programs

Public Law 98-377 National Economic Security Act provided funding to increase inservice training programs for teachers of science and mathematics, starting in the summer of 1986. In the State of California, $3.7 million were available for funding inservice programs proposed by universities, school districts, and other agencies. A total of 114 proposals were submitted seeking $26 million. The requested funds are seven times greater than the available funds! The relatively few funded programs cannot seriously meet the needs identified in this state. Similar wide gaps between needs and available funds are found in many other parts of the United States.

Some private foundations have recently become active in supporting inservice programs for science teachers. In the San Francisco Bay Area, Lockheed has been a leader in employing secondary-school science teachers to work with researchers during the summers. These programs have helped teachers to emphasize the fact that science in American industries means problem solving. Teachers have returned to the classroom with greater determination to avoid emphasis on the memorization of trivia. Unfortunately, these programs are best designed to help well qualified, experienced science teachers. Meanwhile the nation has a growing number of unqualified science teachers.

Relatively small amounts of funds are necessary when we recognize the inservice methods most favored by the teachers themselves. Table 1 provides data showing that the elementary teachers especially want workshops presented by other teachers or district personnel with informal meetings and visits to other teachers. The secondary teachers also give the highest rankings to all of these methods of inservice except workshops presented by district resource persons. Teachers recognize well that experienced master or mentor teachers can provide excellent help to other teachers. They want this local, more individualized assistance especially because it usually has an immediate impact on improving their classroom instruction.

In 1983 California's Senate Bill 813 became the broadest and most expensive school reform bill in the state's history. Among its reforms is the mentor teacher program. Usually the districts' administrators select the mentor teachers from among the outstanding teachers and leaders. Each district sets its own criteria for defining acceptable projects that may be proposed by candidates for the position of serving as mentor teachers. Many districts require their mentor teachers to provide inservice assistance to other teachers in the same district. State funds allow the districts to give their mentor teachers part-time teaching assignments while they are doing their accepted projects. In the Albany School District, a high-school science teacher has used her mentor-teacher time in organizing science activities and assisting teachers throughout the elementary schools of the district.

Suggestions for Inexpensive Programs

The British Columbia Science Assessment demonstrated that teachers want to meet informally with each other and to share their successful ideas. Examples of such meetings can often be found in local associations of science teachers. More than twenty years ago, a dozen high school science teachers began meeting in the San Francisco Bay Area to write a brief requested report to California's Department of Education on the topic of problem solving as a teaching method. Although the initial task was completed within a few months, the Norther California Committee on Problem Solving in Science (NCCoPSIS) has continued to hold monthly meetings for more than two decades. The membership has gradually changed and remains open to any interested teacher. The primary purpose of many meetings has been to exchange exemplary activities developed by the members. Some of their ideas became activities used in the original CHEM Study laboratory manual.

Many science teachers assume that their innovative teaching ideas are of little value. Editors of journals published by state chapters of the National Science Teachers Association are usually eager to publish such ideas but can find few teachers willing to submit manuscripts. On the other hand, when teachers see their articles published, they are usually elated and impressed. Most associations of teachers now recognize the need for providing awards to its outstanding members.

In general, teachers feel that their profession has a low standing in the public's opinion and that outstanding teacher performance goes unrewarded (Gallup, 1984).

Most surveys dealing with inservice programs totally ignore participation in the meetings, conferences, and conventions of professional associations. Nevertheless, the B. C. Science Assessment clearly shows that "annual conferences for science teachers" is almost the most popular form of inservice methods among the junior-secondary school science teachers. "Informal meetings with other science teachers" barely edged such conferences for the highest ranking. Obviously at conferences there are usually many opportunities for informal meetings and discussions among the participants. Similarly, the elementary-school teachers and the senior-secondary teachers gave high rankings to conferences of professional associations.

School districts and state legislatures could provide much inservice assistance at relatively low cost by encouraging participation in the meetings of professional associations. Often such support requires travel funds. Sometimes it includes released time. But the benefits probably greatly outweigh the costs. For example, some science teachers have described their participation in a convention of the National Science Teachers Association as their great emotional inspiration for serving as an energetic science teacher throughout a

84

year or more. Unfortunately, many districts and funding agencies have been suspicious of participation in the activities of professional associations and have felt more secure in funding the most formal types of inservice, e.g., university credit courses. The problem may be a prejudice that blocks adequate assessment of the needs of the teachers and recognition of their professional independence.

Summary

Most teachers are seriously interested in participating in effective inservice programs. The most successful programs involve the teachers actively in initiating, planning, and conducting the programs. Science teachers prefer workshops presented by other teachers and informal meetings with other teachers. Both of these inservice methods occur in the conferences and conventions of professional associations. Participation in such meetings should be encouraged as well as the recognition of exemplary teaching and activities.

REFERENCES

British Columbia Ministry of Education. Junior Secondary Science Curriculum Guide and Resource Book. Victoria, B. C., Canada: Ministry of Education, 1983.

Cuban, L. "School Reform by Remote Control: SB 813 in California." Phi Delta Kappan 66 (3): 213-215, November, 1984.

Gallup, A. "The Gallup Poll of Teachers' Attitudes Toward the Public Schools." Phi Delta Kappan 66 (2): 97-107, October, 1984.

Hobbs, E. D., et al. British Columbia Science Assessment General Report, Volume I, Procedures, Student Test, Conclusions and Recommendations. Victoria, B. C., Canada: Ministry of Education, 1978.

Honig, B. "The Educational Excellence Movement: Now Comes the Hard Part." Phi Delta Kappan 66 (10): 675-681, June, 1985.

Lawrence, G., et al. Patterns of Effective Inservice Education. Tallahassee: Florida Department of Education, 1974.

Lieberman, M. "Educational Specialty Boards: A Way Out of the Merit Pay Morass? Phi Delta Kappan 67 (2): 103-107, October, 1985.

National Science Teachers Association. A NSTA Position Statement: Science - Technology - Society: Science Education for the 1980's. Washington D. C., November, 1982.

Popham, W. J., K. L. Cruse, S. C. Rankin, P. D. Sandifer, and P. L. Williams. "Measurement-Driven Instruction: It's on the Road." Phi Delta Kappan 66 (9): 628-634, May, 1985.

Rice, D. R., et al. "Test Your Legal Ability." The Science Teacher 48 (5): 42-45, 1981.

Sieben, G. A. and E. D. Hobbs. British Columbia Science Assessment General Report, Volume II, Teacher Survey. Victoria, B. C., Canada: Ministry of Education, 1979.

Science Curriculum Framework and Criteria Committee under the direction of the California State Board of Education. (1984). Science Framework Addendum for California Public Schools: Kindergarten and Grades One Through Twelve. Sacramento: California State Department of Education, 1984.

Taylor, H., ed. British Columbia Science Assessment 1982: General Report. Victoria, B. C., Canada: Ministry of Education, 1982.

Chapter 4

A PARADIGM FOR STAFF DEVELOPMENT PLANNING

Donald C. Orlich

Staff development is a basic component in the continuing preparation of teachers and administrators as their professional knowledge is extended. As a result, much has been written about the topic with over 12,200 citations currently listed in Education Resources Information Center (ERIC). Most of the published papers are nonempirical, thus one cannot use them as a data base by which to induce testable theory. Nicholson et al. (1976) came to a similar conclusion after studying approximately 2,000 published and unpublished inservice related documents.

Scope of the National Problem

The number of those conducting and participating in staff development via inservice education is staggering. Joyce et al (1976) calculated that there was about one inservice instructor for every eight teachers in American schools.

Feistritzer and McMillion (1979) calculated that in fiscal year 1980 approximately $340,000,000 was spent at the federal level alone on projects involved with personnel development and inservice training. Moore and Hyde (1978) provided evidence that the public schools may be expending from three to six percent of their operating budgets on inservice education activities. Using the lower estimate, the United States may be investing almost three billion dollars yearly for inservice education. (Amount derived from *Digest of Education Statistics 1983-84*.) From a fiscal perspective, inservice teacher education is obviously a major activity in America's public schools (Orlich, 1982).

Criticisms of Inservice Programs

Davies, in testimony before a Congressional subcommittee, stated that: "Inservice teacher training is the slum of American education--disadvantaged, poverty-stricken, neglected, psychologically isolated, whittled with exploitation, broken promises, and conflict" (as cited in Bush, 1971, p. 38).

Collectively, published studies indicated that inservice programs may be characterized by the following weaknesses: (a) lack of a planned or systematic approach, (b) lack of adequate funding, (c) lack of continuity from preservice to inservice, (d) tendency to be administratively dominated, (e) tendency to be implemented on a crash basis, (f) irrelevant to perceived professional needs, and (g) lack of direction , i.e., theory. (See, Betz, Jensen & Zigarmi, 1978; Brimm & Tollett, 1974; Dillon, 1976; Joyce et al., 1976; NEA, 1973; *NEA Reporter*, 1974; and Nicholson et al., 1976.)

Positive Effects of Inservice Programs

Contrariwise, several studies report positive effects of inservice training. Borg et al. (1970; Hall & Loucks (1978); Oja (1980); Runkel, Wyant, Bell & Runkel (1980); Carney et al. (1979); Cohen & Perez (1980); Williams (1978); Baca (1979); and Bethel & Hord (1981) reported successfully conducted inservice programs. These successful programs either explicitly or implicitly tended to rely on a described conceptual model, e.g., competency based, organization development, social system, concerns based, developmental, or AAIM.

The basic assumption of this writer is that if school district staff development directors rely on an explicit planning paradigm, they increase the probabilities that their inservice education efforts will be successful. The remainder of the paper is devoted toward elaboration of this assumption.

Theory, Paradigms, Staff Development and Inservice Programs

The lack of theory associated with the bulk of inservice training programs at all levels is documented adequately by Rubin's (1971) early collection of essays and papers. In a scathing criticism about the quality of staff development, Cruickshank, Lorish, and Thompson (1979), reported the apparent lack of theoretically based inservice programs and concomitant problems.

Feiman (1981) observed a lack of theory being applied by inservice designers and suggested using: (a) scientific or causal, (b) analytic, and (c) naturalistic models. Feiman, however, did not propose any specific inservice models.

Fenstermacher and Berliner (1983) published A Conceptual Framework for the Analysis of Staff Development which is one of the few attempts to establish a workable model. They identified four critical determinants for staff development: (a) initiation, (b) purpose, (c) participation, and (d) motivation. These are expanded into three dimensions (worth, merit, and success) with an accompanying 12 enhancing conditions. However, their framework is not a theoretical paradigm but is basically an evaluation model. Further, their framework is not "needs" driven and could be used to perpetuate rationalized inservice programs.

Likewise, Gall and Renchler (1985) published "...A Research-Based Model" for staff development in which 27 criteria were listed by which to conduct inservice projects or to plan an effective staff development program. Their criteria, while having some empirical bases, are very similar to those of Lawrence (1974), Edelfelt (1977), and Craven (1978). The 27 criteria, if followed, would improve the general nature of staff development, but Gall and Renchler do not collapse their extensive list into a useable paradigm.

Glassberg and Oja (1981) presented one model derived from the major conclusions of the developmental psychologists, e.g., Piaget (1970) and Kohlberg (1971). Hall and Loucks (1978) suggested the Concerns Based Adoption Model or "CBAM Model." Lieberman and Miller (1979) edited several major statements and research findings; as did Griffin (1983).

However, the above models and statements may be categorized as being too specific and not adequately comprehensive. My intent is to synthesize several models into a meaningful and useful paradigm that may be applied or tested in the schools. The paradigm, predictions, and practices would interact in a cyclical manner.

Applying the Concept of Theory

The simplest definition of a theory is taken from Hardie (1973) who wrote that, "Theories thus should be seen as deductive systems whose theorems, when suitably interpreted in observational terms, become laws to which our observational generalizations are approximations" (p. 90). While there are more comprehensive definitions of theories (Popper, 1959 and Kuhn, 1962), the essence of a theory is to provide a deductive system, i.e., provide general statements that may be applied to specific cases. Further, given a valid theoretical premise, one should be able to predict the consequences of those activities associated with the theory. If, upon verification, the theory helps one to predict consequences with a high degree of accuracy or probability, then a user of the theory may begin to place even greater confidence in its future applicability.

Brodbeck (1973) discussed the concept of "models" in the construction of theories by noting that the terms model and theory were often synonyms. She wrote that models may: (a) be tentative and unconfirmed, (b) exhibit isomorphism, (c) have if-then relationships, (d) have an established order of traits, (e) be comprised of concepts, and (f) serve to connect identified variables.

Black (1973) concluded that models help to establish dynamic relationships of the various parts of a theory. He then identified the following five conditions needed to construct a theoretical model: (a) an original field of study is described, (b) facts and regularities associated with the field need explanation, (c) related components or systems are identified, (d) explicit or implicit rules are formulated, and (e) inferences or hypotheses which emerge are verified or refuted by empirical tests.

My proposal, however, is not a theory. My intent is to provide a pretheoretical statement--a paradigm--that provides workable concepts and describable models within a structured typology for school staff development decision-makers. My rationale for proposing a paradigm is rather basic: My statement, to date, cannot meet the test of Black's

(1973) five criteria for the establishment of a theory. But, my statement clearly meets Gage's (1963) criteria for a paradigm.

Characteristics of a Paradigm

Gage (1963) wrote that: "Paradigms are not theories; they are rather ways of thinking or patterns for research that, when carried out, can lead to the development of theory" (p. 95).

Two major characteristics of a paradigm were then identified by Gage. First, a paradigm is generalizable to a class of events or processes. Second, a paradigm may represent variables and their relationships in graphic form.

Thus, a paradigm represents a pretheoretical statement which attempts to provide order to a class of events and to provide a means by which that order may be communicated.

The ultimate end of paradigm building is to describe and predict practices or the consequences that will probably follow by applying the identified concepts or models in the most appropriate manner and then observing predictable results. This is the process of validation.

The above discussion relating to the construction of a paradigm for inservice teacher education is most essential, for as Hofstadter (1963) observed, educators for the most part, especially administrators, have a great distrust and disdain for theory. And, that includes paradigms!

Definitions of Staff Development and Inservice Education

Before presenting the paradigm, the problem of defining inservice must be addressed. Various terms are used to define the concept of inservice teacher education. These include: professional development, inservice training, professional growth, staff development, continuing education, on-the-job training, organization development, inservice teacher education, continued professional development, and inservice education.

A rather detailed analysis of about 2,000 documents like this relating to inservice education was accomplished by Nicholson et al. (1976). This group had a difficult time determining both a definition for inservice and a common descriptor for it. Showing a sense of humor at the situation, the team prepared a grid by which one could invent one's own descriptor. To do so, simply mix or match any three terms from columns A, B, or C (Nicholson et al., 1976, p. 79).

Descriptors for Inservice--Generate your Own Term

A	B	C
Continuing	Staff	Development
Continued	Professional	Growth
	Teacher	Education
	Personnel	Renewal
		Improvement

It should be noted that staff development subsumes inservice education. The connotation of any definition tends to be critical. One major connotation describes staff development and inservice education as distinct processes; while another views them as distinct acts. How one implements a staff development program is highly dependent on the connotation of the definition being assumed.

Throughout this paper it is implied that inservice education will lead to changes in the classroom, individual building, or district operations. Thus, one should be aware of various theories concerning change strategies. But that is a topic for another time. Further, a staff development and inservice paradigm is of great use to program designers for it causes them to analyze their assumptions, assertions, and definitions before they even begin the planning of projects. Such analyses are notoriously lacking from the current state of the art for inservice programs. My plea is for systematic decision-making followed by action, not the converse.

Described Models for Staff Development

Since 1976, I have attempted to describe various theories, paradigms, typologies, and models for inservice. There appear to be currently described in the literature, three general typologies which seem to subsume at least 14 different inservice models. The three general typologies focus on: (a) organizations, (b) individuals, and (c) roles. These and the attendant models are enumerated below and are then expanded. However, these models all need greater development to be operationally defined and implemented. That development, obviously, is beyond the scope of this paper.

Typology 1. Organization Based Models

The common characteristic of organization based inservice models is the focus on the institution, agency, or school building. To be sure, individuals are considered as givens in this typology. Organizationally related problems are identified, usually by needs assessments. The primary emphasis is to correct deficiencies or provide new skills in the system or a related subsystem. At least four models have been described in the literature.

1. AAIM Model (Orlich, 1979)
2. School Based Model (Henderson, 1979; Goodlad, 1955 and 1978; Howey, Bents & Corrigan, 1981; and Bolan, 1982)
3. Organization Development (Schmuck & Miles, 1971; and Runkel, Wyant, Bell & Runkel, 1980; and Dillon-Peterson, 1981)
4. Social Systems Model (Getzels, 1959)

Typology 2. Individual Based Models

The basic premise of all individual based models is that individuals, per se, make the "difference" between an effective and an ineffective organization. The amount of freedom given to the individual varies with each of the four identified models. There is little freedom in the behavioral model and nearly absolute freedom in the humanistic model.

1. Behavioral Model (Skinner, 1969; and Litzenberger, 1979)
2. Humanistic Model (Combs, 1962; and Beck, 1978)
3. Concerns Based Adoption Model (Hall & Loucks, 1978)
4. Developmental Model (Oja, 1980)

Typology 3A. Role Based Models (Static)

Role based models have as a common characteristic the emphasis on the practitioner's role as determined by the institution and modified by the individual. (See Figure 1 for the interactive model.) Role-based models focus on the individual's self-determination of needs, but in an institutional context. Three models fitting this typology have been published.

1. Independent Study Model (Kipp, Thayer & Olivero, 1981; and NEA, 1971)
2. Competency Based Model (Borg, Kelley, Langer & Gall, 1970; and AAAS, 1967)
3. Educator Center Model (Bell & Peightel, 1976; Feiman, 1977; Donaldson, 1982; and Huddle, 1982)

Typology 3B. Trainer Based Models (Dynamic)

Trainer based models rely on specifically trained personnel to conduct on-site training. To be certain, all models require specifically trained individuals to conduct the training. But, models subsumed under typology 3B require the additional role function of an outside intervener or a person who is "certified" to conduct inservice activities. Three models have been described in the literature as exemplars.

1. Exchange Model (Carlson & Potter, 1972)
2. Linking Agent Model (Sieber, Louis & Metzger, 1972; and Havelock, 1967)
3. Advocacy Model (Gray & Myers, 1978; and Hunter, 1979a and 1979b)

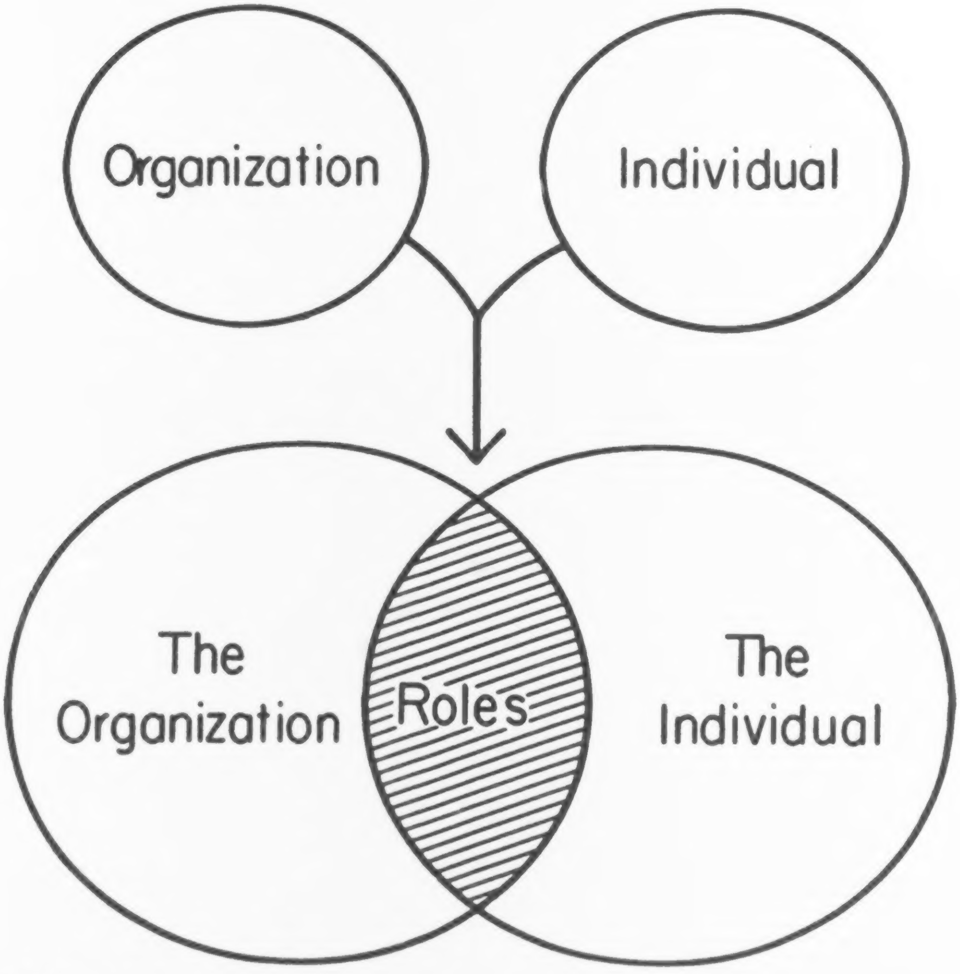

Organization
Individual
The Organization
Roles
The Individual

Figure 4-1.

Using the Paradigm to Plan

Each of the above models contains concomitant concepts, assumptions, techniques, and characteristics which establishes it as being unique. The manner in which a model is implemented or conducted can be adapted to a number of delivery systems. Table 4-1 illustrates a set of potential delivery systems.

Table 4-1. Partial Listing of Inservice Delivery Systems

1. Amplified telephone
2. Cadre system
3. Classes
4. Class observations
5. Clinics
6. Coaching
7. Committees (task group)
8. Computer aided instruction
9. Conferences
10. Consultants
11. Continuing education
12. Discussion groups
13. Educational TV
14. Films
15. Extension courses
16. Institutes
17. Instructional TV (close circuit)
18. Internships
19. Laboratories
20. Lectures
21. Micro-teaching
22. Oral tradition
23. Paired-teaching
24. Professional association meeting
25. Professional association training
26. Professional journals
27. Programmed instruction
28. Resource persons
29. Role modeling
30. Role playing
31. School/University cooperatives
32. Simulations
33. Staff meetings
34. Study groups
35. Teacher visitations
36. Teacher association briefings
37. Team teaching
38. Two-way telecommunications
39. University courses
40. Workshops

The goal of this paper is to illustrate that all staff development programs must first be examined to determine exactly what typology is being applied. Inservice planners will be shown that if they select a specific typology, then they will be able to match a compatible action model by which to implement the inservice activities in the most efficacious manner. Thus, the paradigm anticipates the consequences of the initial decision. Refer to Figure 4-2 at the end of this paper to observe how the planning is initiated. Each model will now be examined in more detail to observe its unique characteristics.

A Short Expansion of the Typologies

Typology 1. Organization Based Models

The AAIM model. Orlich (1979) described a six-step process model for the conduct of inservice by relying on needs assessments followed by five other logical steps. The six steps are: (a) assessment, (b) awareness, (c) application, (d) implementation, (e) maintenance, and (f) evaluation. Full commitment to the training takes place during the implementation phase. All appropriate personnel are trained during the first five steps in this model. The final phase is the maintenance of a continued and longitudinal set of activities. Evaluation is viewed as a continuing process.

School based model. Henderson (1979); Goodlad (1978); Howey, Bents, and Corrigan (1981); and Bolan, (1982) describe school based inservice models. Inservice is a process to accomplish school change efforts. This model has great application to programs as the individual school becomes responsible for its own improvement. As early as 1955, Goodlad proposed the school as a basic unit for change and implied that inservice was the means to accomplish curriculum change. (We seem to have progressed very little in 30 years!)

Organization development model. Schmuck and Miles (1971); Runkel, Wyant, Bell and Runkel (1980); Fullen, Miles and Taylor (1980); and Dillon-Peterson (1981) described the major elements of the organization development (OD) model. Proponents of OD stress that most school systems are "reactive" in characteristic and that by incorporating the major techniques of OD, districts may become "proactive," i.e., anticipate problems and solve them before they interfere with organizational efficiency.

Organization development is a series of processes and strategies that focus on the organization. Members of the general system and the various subsystems diagnose and analyze strengths, weaknesses, and potentials. The organizational plan determines the changes that are needed and identifies the personnel and implementation strategies required to achieve them.

Social system model. The social system model is in reality an authoritarian adaptation of a theory published by Getzels (1959). Organizational and institutional goals are paramount in this model; with the superordinate making his or her wishes felt by all subordinates.

Inservice programs which fit this model are those that are administratively dominated and planned. It would appear that the popularity of teacher centers is a direct reaction to the social system model.

Typology 2. Individual Based Models

A behavioral model. The basis for the behavioral model stems from the pioneering work of Skinner (1969). However, for inservice, the model is more precisely described by Litzenberger (1979). Litzenberger adapted single subject design to incorporate both a research and evaluation basis for programs that focus on just one person or one subsystem.

The behavioral model requires that: (a) a problem be identified, (b) base-line behaviors be charted, (c) a contingency be introduced, (d) new behaviors be charted, and (e) evaluation be continuous.

Humanistic model. Combs (1962) and Rogers (1969) imply use of the humanistic model for inservice education. However, Beck (1978) illustrates how humanistic tenets are applied directly to inservice programs. Humanistic programs stress application of the affective domain. Emotions and feelings are encouraged. The entire process tends to proceed "unscheduled" with human relations skills, warmth, and trust being emphasized. Flexibility is the critical concept.

Concerns based adoption model. Hall and Loucks (1978) and Loucks and Hall (1977) describe the Concerns Based Adoption Model (CBAM). The basis of CBAM is that change is viewed as a process to be accomplished by people who are involved both experientially and emotionally. Through the use of systematic data collection, individual differences, and concerns about impending changes may be assessed. The "Stages of Concern" in CBAM have seven ascending levels: awareness, information, personal, management, consequence, collaboration, and refocusing. Eight "Levels of Use" of an innovation: nonuse, orientation, preparation, mechanical use, routine, refinement, integration, and renewal are also identified. The CBAM model requires longitudinal commitment--one shot projects cannot suffice.

Developmental model. Knowles (1980) expresses the major assumptions and tenets of the developmental model. However, Oja (1980) and Glassberg and Oja (1981) describe how the model is applied. The developmental model assumes that adults have a great accumulation of valuable experiences on which to draw, they are self-directed, and enjoy problem oriented learning rather than subject centered learning alone. (Obviously, there are cases when "subject material" is critical to adults, especially in the professions where information and skills change so rapidly.) Plans are *goal focused* rather than being focused on specific objectives.

Typology 3A. Role Based Models (Static)

Independent study model. Independent study, e.g., the correspondence course has been available for most of the 20th century. The National Education Association (1971) prepared several sets of materials for teacher use with inservice programs. These materials were designed for individual or small group utilization.

The Association of California School Administrators developed a training model called "Project Leadership" (Kipp, Thayer & Olivero, 1981). Project Leadership is one of the few inservice programs designed specifically for school administrators. They identify their own high priority goals for continued learning. The project utilizes a peer network and workshop format for some training.

Project Leadership is based somewhat on the anthropological finding that administrators rely on "oral tradition" in the continuation of their professional training.

Competency based model. The competency based model for inservice is an adaptation of the behavioral model. One of the early programs was "Science: A Process Approach" produced by the American Association for the Advancement of Science (AAAS, 1967).

Borg, Kelley, Langer, and Gall (1970), then of the Far West Laboratory for Educational Research and Development, produced a series of teacher skill related mini-courses that used: (a) print materials, (b) training and modeling films, and (c) micro-teaching as the subsystems. The Far West Laboratory mini-courses focus on specific sets of teaching strategies, e.g., questioning or tutoring mathematics. Each mini-course is nearly self-contained. If one were diagnosed as needing an extension of some skill, e.g., questioning, then, one could use that mini-course and it would be "inservice for one," an independent model, to be sure.

Educator center model. The teacher center was imported to the United States by American teachers who visited British schools. Centers are administered by teachers to meet their own perceived needs (Bell and Peightel, 1976; and Feiman, 1977).

The rationale for educator centers rests on three premises: (a) fundamental reform comes only through the teachers who must implement such changes; (b) teachers are unlikely to change how they teach simply because they are told to do so; and (c) teachers take reform seriously only when they define their problems, determine their needs, and voluntarily seek help.

The Maryland Professional Development Academy (Huddle, 1982) and the Maine Principals Academy (Donaldson, 1982) are adaptations of the teacher center concept. These academies are excellent examples of professional educational centers which focus on critical concerns of principals.

Typology 3B. Trainer Based Models (Dynamic)

The trainer-based models are a special subset of the role models. The basic difference between the role and trainer distinction is one of a specialization. It may be argued that trainers play a dynamic role and thus should be simply included in the role typology. However, it may also be argued that training roles are distinct sets of roles that emerge from special considerations and are more dynamic than the static aspects of role-based models. To accommodate this apparent difference, a special typology is extended from role-based models.

The exchange model. Carlson and Potter (1972) described a project which they called the "Behaviorally Engineered Classroom for Rural Areas" (BECRA). The objective of BECRA was to provide special education services. The exchange aspect stemmed from preparing preservice students to use all aspects of the BECRA model. Students then worked as aides in a selected school as part of their orientation to know teachers and children in specific classes. The inexperienced teachers replaced their respective experienced teachers in the rural schools. The teachers were then brought to the University of Idaho campus to receive the same training.

The exchange model is most effective as it allows teachers to be trained during the regular school day, but with no loss to the children or the school districts. Further, it permits intensive instruction, rather than a simple awareness training session, and is applicable to almost all areas of the school curriculum.

Linking agent model. Havelock (1967) was an early proponent of the linking agent model as a means of disseminating research data from the generators of knowledge to the transmitters of knowledge--the practitioners. Sieber, Louis, and Metzger (1972) reported an extensive national project that utilized educational linkers--identified as dissemination agents. The linking model is an adaptation of the very successful agricultural extension agent.

Advocacy model. Gray and Myers (1978) described the "Bay Area Writing Project" (BAWP), an inservice model that teaches teachers how to teach writing more effectively. Gray and his associates established an inservice system that builds in a "multiplier effect." While the emphasis is on English teachers, the BAWP has had an impact on writing instruction in all areas of the school. The cadre of trained teachers thus become advocates for writing--not just English instruction.

Hunter's (1979a and 1979b) "Theory into Practice" model is an excellent example of the advocacy model. Her program has four main elements: (a) teaching to an objective; (b) teaching at an appropriate level of difficulty for the learners; (c) monitoring and adjusting instruction; and (d) increasing motivation, learning, retention, and transfer.

The advocacy component comes not from the four basic elements of the program, but from the delivery and indoctrination systems that are built into the presentation of the elements by "certifying" clientele. By "credentialing" trainers, the model automatically builds, through a pyramiding principle, a huge corps of advocates.

Implications for Staff Developers

By selecting a testable typology and model from the paradigm, inservice education directors may speculate about the logical consequences of their decisions. That is one of the powerful advantages of using an explicit paradigm. Further, the more closely that the elements of the paradigm converge, the higher the probability that the inservice project will be successful. A valid paradigm generates predictable and successful results.

Figure 4-2 provides a dichotomous key which may be used to classify any inservice model or to determine the most likely model for success of a specific project. This key is contructed similarly to plant or animal classification schemes. The inservice model taxonomy is designed to establish hierarchical relationships between the various models and may be expanded to accommodate other models as they are operationally described in the literature.

For example, if a school district assessment illustrates a need to improve some institutional dimension of a selected school, then the inservice director would seek a typology and models which are convergent within the institutional context, i.e., an organizational typology. There would be a series of different models from which to choose. The model ultimately selected would best coincide with the intended needs and goals. Compatibility of training, focus, and delivery will converge by explicit planning and by following the rules of the paradigm. By applying the paradigm, efficacious inservice programs will evolve as a science--not simply as change events.

Figures 1 and 2 illustrate how the paradigm may be applied. Of critical importance are the decision-making processes being employed. Further, inservice directors must have a great knowledge about the field of inservice teacher education to apply the paradigm. Table 4-2 illustrates the relationships that exist between the various elements.

Conclusion

I have attempted to describe a comprehensive paradigm for the totality of staff development and attendant inservice programs and projects. To state that one has, indeed, identified the major paradigm, typologies, and models for the profession may be naive and optimistic--if not arrogant. Yet, this proposal must be considered as a major step in providing a comprehensive staff development system for identifying and implementing effective, consistent and concept oriented inservice programs. When directors, administrators, designers, and planners are aware of internally consistent inservice typologies and models, they may begin to view inservice education as an esteemed activity, not something that is conducted by the organization in a perfunctory manner.

Others will certainly examine and evaluate this paradigm. It is predicted that changes will be made and that typologies and models will be created, merged, and deleted. That process, of course, is in keeping with a scholarly and scientific tradition. Yet, there is the potential that inservice education could be positively affected by the acceptance and implementation of this planning paradigm.

A Planning Taxonomy for In-Service Education Models

Prior to designing any staff development program, select the one major focus or goal of the intended project, then proceed through the key.

The Goal or Focus is:

To further the organization. Go to 1.
To promote individual competence. Go to 4.
To change an individual's role. Go to 7.
To develop a cadre of trainers. Go to 9.

1. The goal of the project is to develop a systematic plan for the organization. Use the AAIM model.

1a. The goal for the project is to develop some subsystem within the organization. Go to 2.

2. The goal of the project is to focus on one school or one unit in the organization. Use the "School Based" model.

2a. The goal of the project is not focused on any one specific unit. Go to 3.

3. The goal of the project is to increase the organization's problem solving capacity. Use "Organizational Development" model.

3a. The goal of the project is to promote a social hierarchy. Use "Social Systems model.

4. The project will emphasize the concept of "reinforcement." Use the "Behavioral" model.

4a. The project will not emphasize "reinforcement" techniques. Go to 5.

5. The project will place a premium on individualism. Use "Humanistic" model.

5a. The project will not stress individualism, per se. Go to 6.

6. Individual concerns will be prime focus of the project. Use "CBAM" model.

6a. The project will stress individual growth and development. Use the "Developmental" model.

7. The goal of the project is to promote individualized training materials. Use "Independent Study" model.

7a. The goal of the project is not to focus on individualized training materials. Go to 8.

8. The goal of the project is to utilize carefully prescribed competencies or objectives. Use the "Competency Based" model.

8a. The goal of the project is to establish a common learning site. Use the "Educator Center" model.

9. The goal of the project is to develop trainers by allowing individuals to trade "role" positions. Use "Exchange" model.

9a. The goal of the project is to use other means to develop trainers. Go to 10.

10. The goal of the project is to establish change agents within the system. Use "Linking Agent" model.

10a. The goal of the project is to create a pool of staunch program supports. Use "Advocacy" model.

Figure 4-2. A Dichotomous Key Applied to Staff Development

Figure 4-2. Schemata of the Paradigm

		Elements of the Paradigm		
	Typologies (Focus)	Models (Operation)	Characteristics (Variables)	Delivery Systems (Mechanisms)
I.	Organization	AAIM	Major systems	Decision-makers would select most appropriate delivery system by which to conduct inservice education. Refer to Table 1 for listing.
		School-Based	Individual subsystems	
		Organization Development	Systems and subsystems	
		Social System	Superordinate and subordinate dimensions	
II.	Individual	Behavioral	Single subject designs	
		Humanistic	Relations and interactions	
		Concerns-Based	Individual needs	
		Developmental	Experiential orientation	
III.	Roles (Static)	Independent Study	Transmission of knowledge	
		Competency	Demonstration of skills or processes	
		Education Center	Special focal groups	
IIIB.	Trainer (Dynamic)	Exchange	Modeling and inter-changes	
		Linking Agent	Outside interventions	
		Advocacy	Credentialing of clientele	

REFERENCES

American Association for the Advancement of Science. Guide for Inservice Instruction: Science--A Process Approach. (AAAS Misc. Publication 67-9). Washington, DC: Commission on Science Education, 1967.

Baca, R. B. A Study of Inservice Effectiveness on Activity-Oriented Science Teaching. Unpublished doctoral dissertation, Washington State University, Pullman, 1979.

Beck, W. "Testing a Noncompetency Inservice Education Model Based on Humanistic or Third Force Psychology." Education 98: 337-340, 1978.

Bell, H. H. Jr., & J. W. Peightel. Teacher Centers and Inservice Education. (Fastback No. 71). Bloomington: The Phi Delta Kappa Educational Foundation, 1976.

Bethel, L. J., & S. M. Hord. A Case Study of Change: Inservice Teachers in a National Science Foundation Environment Science Education Program. Paper presented at the Annual Meeting of the American Educational Research Association, Los Angeles, CA, April, 1981.

Betz, L., D. Jensen, & P. Zigarmi. "South Dakota Teachers View Inservice Education." Phi Delta Kappan, (Research notes) 54: 491-493, 1978.

Black, M. "Models and Archetypes." In H. S. Broudy, R. H. Ennis & L. I. Krimerman (Eds.), Philosophy of Educational Research, (pp. 483-501). New York: John Wiley and Sons, 1973.

Bolan, R. (Ed.). School-Focused Inservice Training. London: Heinemann Education Books, 1982.

Borg, W. R., M. L. Kelley, P. Langer, & M. Gall. The Mini-Course: A Microteaching Approach to Teacher Education. Beverly Hills, CA: Macmillan Educational Services, Inc, 1970..

Brimm, J. L., & D. J. Tollet. "How Do Teachers Feel About Inservice Education." Educational Leadership 31: 521-524, 1974..

Brodbeck, M. "Models." In H. S. Broudy, R. H. Ennis, & L. Krimerman (Eds.), Philosophy of Educational Research, (pp. 475-482). New York: John Wiley and Sons, 1973..

Bush, R. N. "Curriculum Proof Teachers: Who Does What For Whom?" In L. J. Ribin (Ed.), Improving Inservice Education: Proposals and Procedures for Change, (pp. 37-70). Boston: Allyn and Bacon, 1971.

Carlson, L. B. & R. E. Potter. "Training Classroom Teachers to Provide In-Class Educational Services for Exceptional Children in Rural Areas." *Journal of School Psychology* 10: 147-151, 1972.

Carney, M., E. M. Davila, M. Graubard, M. Gwaltney, M. Hunter, & N. King. *Inservice Training in Desegregated School Districts: Eastern Region Case Studies.* (Rand-N-1251-NIE). Santa Monica, CA: Rand Corporation, A Rand Note prepared for the National Institute of Education, August, 1979..

Cohen, E. G., & T. R. L. Perez. *Organizational Model for School Change Memorandum.* (Grant No. OB-NIE-78-0212), Stanford University, Final Report (P-4), National Institute of Education, June 30, 1980.

Combs, A. W. (Ed.). *Perceiving, Behaving, Becoming.* Washington, DC: National Education Association, Yearbook for Association for Supervision and Curriculum Development, 1962.

Craven, E. M. *An Evaluation of an Implementation Model for Elementary School Science.* Unpublished doctoral dissertation, Washington State University, Pullman, 1978.

Cruickshank, D. R., C. Lorish & L. Thompson. "What We Think We Know about Inservice Education." *Journal of Teacher Education* 30: (1), 27-32, 1979.

Dillon, E. A. "Staff Development: Bright Hope or Empty Promise." *Educational Leadership* 34: 165-170, 1976.

Dillon-Peterson, B. (Ed.). *Staff Development/Organization Development.* Alexandria, VA: Association for Supervision and Curriculum Development, 1981..

Donaldson, G. A. Jr. "Rx for School Leadership: The Maine Principals' Academy." *Phi Delta Kappan* 63: 400-401, 1982.

Edelfelt, R. A. (Ed.). *Inservice Education: Criteria for and Examples of Local Programs.* Bellingham: Western Washington State College, 1977.

Edelfelt, R. A. & M. Johnson. (Eds.) *Rethinking In-Service Education.* Washington, DC: National Education Association, 1975.

Feiman, S. (Ed.). *Teacher Centers: What Place in Education?* Chicago: University of Chicago Press, Center for Policy Study.

Feiman, S. "Exploring Connections Between Different Kinds of Educational Research and Different Conceptions of Inservice Education." *Journal of Research and Development in Education* 14: (2), 11-21, 1981.

Feistritzer, E. D. & R. J. McMillion. The 1980 Report on Educational Personnel Development. Washington, DC: Feistritzer Publications, 1979.

Fenstermacher, G. D. & D. C. Berliner. A Conceptual Framework for the Analysis of Staff Development. Santa Monica, CA: Rand Corporation, N-2046-NIE, 1983.

Fullan, M., M. B. Miles & G. Taylor. "Organization Development in Schools: The State of the Art. Review of Educational Research 50: 121-183, 1980.

Gage, N. L. "Paradigms for Research on Teaching." In N. L. Gage (Ed.), Handbook of Research on Teaching (pp. 94-141). Chicago: Rand McNally and Company, 1963.

Gall, M. D. & R. S. Renchler. Effective Staff Development for Teachers: A Research-Based Model. Eugene, OR: Clearinghouse on Education Management, ERIC, University of Oregon, 1985.

Getzels, J. W. "Administration as a Social Process. In D. E. Griffiths (Ed.), Administrative Theory (pp. 150-165). New York: Appleton-Century-Crofts, 1959.

Glassberg, S. & S. N. Oja. "A Developmental Model for Enhancing Teachers' Personal and Professional Growth." Journal of Research and Development in Education 14: (2), 58-70, 1981.

Good, C. V. (Ed.). Dictionary of Education (3rd ed.). New York: McGraw-Hill, 1973.

Goodlad, J. I. "The Individual School and Its Principal: Key Setting and Key Positions in Educational Leadership." Educational Leadership 13: 2-6, 1955.

Goodlad, J. I. "A Preview of Schooling in America." Phi Delta Kappan 60: 47-50, 1978.

Gray, J., and M. Myers. "The Bay Area Writing Project." Phi Delta Kappan 59: 410-413, 1978.

Griffin, G. A. (Ed.). Staff Development (Part II). Eighty-Second Yearbook of the National Society for the Study of Education. Chicago: University of Chicago Press, 1983.

Hall, G. E. & S. L. Loucks. "Teacher Concerns as a Basis for Facilitating and Personalities Staff Development." Teachers College Record 80: (1), 36-53, 1978.

Hardie, C. D. "Research and Progress in Education." In H. S. Broudy, R. H. Ennis, & L. I. Krimerman, (Eds.), Philosophy of Educational Research (pp. 90-91). New York: John Wiley & Sons, 1973.

Hass, C. G. "Inservice Education Today." In N. B. Henry, (Ed.), Inservice Education for Teachers, Supervisors, and Administrators, (Part I). Fifty-seventh yearbook of the National Society for the Study of Education (p. 13). Chicago: National Society for the Study of Education, 1957.

Havelock, R. G. "Dissemination and Translation Roles." In T. L. Eidell & J. M. Kitchel, (Eds.), Knowledge Production and Utilization in Educational Administration (pp. 64-119). Eugene: The Center for the Advanced Study of Educational Administration, University of Oregon, 1967.

Henderson, E. S. "The Concept of School-Focused Inservice Education and Training." British Journal of Teacher Education 5: 17-25, 1979.

Hofstadter, R. Anti-Intellectualism in American Life. New York: Alfred Knopf, 1963.

Howey, K. R., R. Bents & D. Corrigan. (Eds.). School-Focused Inservice: Descriptions and Discussions. Reston, VA: Association of Teacher Educators, 1981.

Howsam, R. B. "Governance of Teacher Education by Consortium." In J. H. Hansen, (Ed.), Governance by Consortium (p. 18). Syracuse: The Multi-State Consortium on Performance-Based Teachers Education, 1974.

Huddle, E. W. "A Maryland Program for the Professional Development of School Principals." Phi Delta Kappan 63: 402, 1982.

Hunter, M. "Diagnostic Teaching." The Elementary School Journal 80: 41-46, 1979.

Hunter, M. "Teaching is Decision-Making." Educational Leadership 37: 62-64, 67, 1979.

Joyce, B. R., K. R. Howey, S. J. Yarger, W. C. Hill, F. T. Waterman, B. A. Vance, D. W. Parker & M. G. Baker. Issues to Face. In-Service Teacher Education Report I. Palo Alto, CA: Stanford Center for Research and Development in Teaching, 1976.

Kipp, W., A. N. Thayer & J. L. Olivero. Project Leadership--Introductory Component, fifth printing and revised edition. Newport Beach, CA: Association of California School Administrators, June, 1981.

Knowles, M. S. The Modern Practice of Adult Education: From Pedagogy to Andragogy, revised and updated. Chicago: Association Press-Follett Publishing Co., 1980.

Kohlberg, L. "From is to Ought." In T. Mischel, (Ed.), Cognitive Development and Epistemology. New York: Academic Press, 1971.

Konecki, L. & A. Stein. "A Taxonomy of Professional Education." Journal of Teacher Education 29: (4), 42-45, 1978.

Kuhn, T. S. The Structure of Scientific Revolutions. Chicago: University of Chicago Press, 1962.

Lawrence, G. Patterns of Effective Inservice Education. Tallahassee: State of Florida Department of Education, 1974.

Lierberman, A. & L. Miller (Eds.). Staff Development: New Demands, New Realities, New Perspectives. New York: Teachers College, Columbia University, 1979.

Litzenberger, J. P. "Behavioral Inservice." Inservice. Syracuse: Syracuse University, National Council of States on Inservice Education, pp. 4, 5, 7-10, October, 1979.

Loucks, S. F. & G. E. Hall. "Assessing and Facilitating the Implementation of Innovation: A New Approach." Educational Technology 17: (2), 18-21, 1977.

Moore, D. & A. Hyde. Rethinking Staff Development: A Handbook for Analyzing Your Program and Its Costs. New York: The Ford Foundation, 1978.

National Education Association. Project on Utilization of Inservice Education R & D Outcomes. Washington, DC: NEA. (ERIC Document Reproduction Service No. Ed 167 558), 1971.

National Education Association. "Inservice Education & Teacher Centers." Briefing memo on Instruction and Professional Development. Washington, DC: NEA, pp. 1-2, 1973.

NEA Reporter. "Teachers Rap Administrator-Run Inservice Days." Washington, DC: National Education Association, Vol. 13, April, 1974.

Nicholson, A. M., B. R. Joyce, D. W. Parker & F. T. Waterman. The Literature on Inservice Teacher Education: An Analytic Review. ISTE Report III. Washington, DC: Office of Education, Teacher Corps. (ERIC Document Reproduction Service ED 129 734), 1976.

Oja, S. N. "Adult Development is Implicit in Staff Development." The Journal of Staff Development 1: (1), 7-56, 1980.

Orlich, D. C. "Establishing Effective Inservice Programs By Taking ... AAIM. The Clearing House 53: (1), 53-55, 1979.

Orlich, D. C. "Inservice Education: Fiscal Implications for Policy-Makers. Planning & Changing 13: 214-222, 1982.

Piaget, J. Science of Education and the Psychology of the Child. New York: Viking Press, 1970.

Popper, K. R. The Logic of Scientific Discovery. New York: Harper and Row Publishers, 1959.

Rogers, C. Freedom to Learn. Columbus, OH: Charles E. Merrill, 1969.

Rubin, L. J., (Ed.). Improving Inservice Education: Proposals and Procedures for Change. Boston: Allyn and Bacon, 1971.

Runkel, P. J., S. H. Wyant, W. E. Bell, & M. Runkel. Organizational Renewal in a School District: Self-Help Through a Cadre of Organizational Specialists. Eugene, OR: University of Oregon, Center for Educational Policy & Management, 1980.

Schmuck, R. A. & M. B. Miles, (Eds.). Organization and Development in Schools. Palo Alto, CA: National Press Books, 1971.

Sieber, S. D., D. S. Louis & L. Metzger. Evaluation of Pilot State Dissemination Programs. New York: Columbia University, Bureau of Applied Social Research, 1972.

Skinner, B. F. Contingencies of Reinforcement: A Theoretical Analysis. Englewood Cliffs: Prentice-Hall, 1969.

Williams, R. L. "A Comparative Study of Metric Skills of Intermediate Students in Calgary, Alberta, and Spokane, Washington. Unpublished doctoral dissertation, Washington State University, Pullman, 1978.

U. S. Department of Education, National Center for Education Statistics. Digest of Education Statistics 1983-84. Washington, DC: (Table 65, p. 80). U. S. Government Printing Office, 1983.

Chapter 5

STRUCTURES FOR DELIVERY OF INSERVICE PROGRAM MODELS

Margaret B. Heimbuck-Petersen

Research states that participants should be involved in creating their own inservice activities. The participation of the teachers in the construction and implementation of their own training requires an organization to facilitate and support such involvement. In a school district, the tasks required to facilitate inservice are usually assigned to a staff development or human resources development department or administrator. These people are responsible for inservice training of teachers as well as other district personnel including teacher aides, administrators, and noninstructional support persons. The staff developers are charged with the responsibility of providing the necessary and appropriate inservice for each group so that the students of the district are guaranteed an equitable education.

In Small School Systems

In a small school district, staff development duties are assigned to an administrator as one of several responsibilities. In some of these instances, the administrator divides the monies available among the groups requiring inservice training. The members of the group or the group leader decides how the money will be used. All groups may not receive money every year. Decisions are made based upon local priorities. Each group is responsible to the staff development administrator for an accounting of the use of the funds.

In other instances, the administrator designs, distributes, and collects data from a needs assessment. These data enable the administrator to plan appropriate inservice programs to meet the expressed needs of the district population. These programs can then be designed with input from the client population, the populations affected by the performance of the client population, and the administrators responsible for the client population.

The implementation of training in small school districts is strongly influenced by the availability of trainers and money as well as by the size of the group desiring training. The personal interest of the administrator assigned the responsibility for staff development can greatly affect the quality and quantity of the inservice activities and the enthusiasm of the district in providing support to the programs. The evaluation of the inservice activities and the quality control of the content and presentation are again closely tied to the individual given the responsibility. The number of responsibilities of the individual appointed to the position of staff development administrator and the interest of the client group in receiving renewal greatly influence the success of a staff development program.

In Large School Systems

In large school districts with many school sites and a great number of employees, providing the necessary staff development activities becomes more complex. The major divisions in organizing the department responsible for the development and implementation of employee training could be instructional personnel, noninstructional personnel, and management personnel. Each division would require an administrator, a staff, and procedures.

Large school systems must also obtain formal input from many diverse organizations from the PTA to the business community. Staff development is one of the areas in which representatives from these organizations can and often do provide input. Advisory groups are an effective way of increasing the access of external groups to the development of human resources within a large school system and of providing a source of resources to the staff developers. Organizations which may be concerned with these advisory groups include the local community college, the local university or college, the local teacher organization, representatives from local businesses (especially those with internal training programs), etc. This form of collaboration is a positive influence on both the cooperating organization and the school system.

To provide an appropriate inservice program for instructional personnel, the administrator and staff would have to consider both teacher and teacher aide categories. In a large school district, student curriculum would be coordinated by supervisors for each subject area. These supervisors would be closely aligned with the staff development personnel. In addition, the administrators who supervise the educational program at each school site would be part of the planning group for the inservice activities of the staffs under their direction. The education professionals and scientists practicing in the university/college system must be included. A process would have to be designed to include all of these various groups in the design and implementation of inservice training.

Inservice activities can be varied in design and implementation depending upon the stated goal of the activity, the objectives agreed upon, and the activities designed to support accomplishing the objectives. The formal evaluation of the inservice can include the site, the arrangements, the presentor(s), the accomplishments of the participants, and the influence of the inservice on the instruction of students. In addition, the informal comments of participants are valuable statements of evaluation of an inservice activity. The formal and informal evaluations should be considered when planning another inservice activity.

A Working Model

In Dade County Public Schools, Miami, Florida, the fourth largest school system in the United States, the staff development functions are assigned to a Bureau of Staff Development. This Bureau is headed by an Associate Superintendent who is assisted by two Directors. One Director is responsible for management training and assessment; the other Director is assigned responsibility for instructional and noninstructional inservice activities. The Dade-Monroe Teacher Education Center (TEC) plans and implements the training for instructional personnel which includes teachers and teacher aides and assistants. The center physically consists of a professional library and offices for the TEC Director and a staff of nine teachers on special assignment and nine secretaries and registrars. The registration unit of two registrars and one secretary is located in a staff development office building where all credit records and computer terminals are located. The remaining staff is located at the Teacher Education Center.

The center is funded in dollars by the State of Florida according to the number of students attending the school system and in university hour credits using the same number of students. The school system receives and credits to the center three dollars for each student. This money is budgeted for salaries, supplies, maintenance, equipment, professional services, library supplies, substitute teacher funds, and other operating expenses. The State Department of Education is given an amount of money to be disbursed to the universities and colleges in the state through the state teacher education centers. Distribution to each center is based on student enrollment. Dade TEC receives an allocation which is then negotiated with those universities and/or colleges able to provide services to the instructional personnel in the district school system. A contract is prepared for each university describing the services expected and the amount of money needed to support providing those services. The contracts are signed by the school system and the universities and sent to the Department of Education. At the end of the fiscal year, the delivery of services is verified for each contract. The universities receive payment during the fiscal year from the Department of Education for delivery of services to the school system.

The Dade-Monroe Teacher Education Center is required by state law to have an advisory council composed of administrators, teachers, college representatives, and community representatives. This council has a majority of teacher members and meets once a month. The council recommends policy and procedures, develops goals and objectives, recommends employment of the director and staff, recommends a budget, and develops the inservice plan.

The teacher center in Dade County supports inservice activities for instructional personnel in response to state and local mandates and in response to the expressed needs of the teachers and teacher aides and assistants. The basis for offering master plan credit (inservice credit) for the successful completion of inservice activities is a collection of course outlines prepared by education professionals in Dade County and approved by the TEC Director, the Dade County School Board, and the Department of Education. The master plan point credits received by participants are accepted by the State of Florida for renewal of a teaching certificate if they are within the state guidelines, are accepted by Dade County Schools for a Professional Incentive Plan salary increase if they are within the local guidelines, and are accepted by Dade County for a longevity salary increase if they meet those local requirements.

An inservice program of a magnitude to service 13,000 teachers effectively must have a trained reliable support system. In Dade County, there are school site TEC Representatives (classroom teachers) who are a valuable support system for the teachers on special assignment and the Director. These teachers assume the responsibility to assist their school personnel to consider having inservice activities on site, to counsel school site staff regarding the need for inservice to renew teaching certificates, and operate as a communication link between the TEC staff and the school. This link is necessary in building a strong chain for inservice support.

One of the duties assumed by the TEC Representatives is the distribution and collection of the annual needs survey forms. The data collected through this survey is the basis for the selection of courses to be offered on the TEC bimonthly calendar of inservice activities. This formal method of determining the direction teachers want their center to follow is combined with the evaluation of the inservice activities and the informal comments of teachers to enable the TEC staff to prepare course outlines and course offerings to meet the needs of the clients.

The TEC School Representatives attend at least one training session each year to update the information they have about the operation of the center and their responsibilities as a liaison to teachers and teacher aides and assistants. The training sessions have grown from information receiving sessions to actual training sessions during which the representatives receive training in conducting group discussions designed to collect informal needs survey data from a faculty or faculty group. The representatives have been very pleased with the training and have requested follow-up training sessions to improve their skills. Each year a TEC Representative becomes more valuable as training improves their data gathering and communication skills.

The services of the TEC staff and TEC Representatives are necessary to support the multitude of programs and services available through the Dade-Monroe Teacher Education Center. The educational specialists who are teachers on special assignment serve as liaisons to the over 260 schools and instructional outreach centers in Dade County. They are available as consultants to serve on design teams in planning school focused inservice programs. If 10 teachers in the district get together or 10 teachers from one school site agree to take an inservice course, that inservice course will be scheduled on site at that school. The initiator of the request may select a specific instructor and request specific times. The instructor may be a teacher, a university professor, or a community expert. If changes must be made in the request, the TEC staff will assist the school personnel in adjusting the request so the inservice can be implemented.

Each curriculum specialist (e.g., the science supervisor) in the District's Bureau of Education is assigned a TEC liaison who will assist in the planning and implementation of inservice activities mandated by law or rule and those inservice activities initiated by the Bureau.

Maintaining the collaboration with the 11 universities who contract with TEC for delivery of services is another responsibility of the educational specialists. This staff creates and publishes two bimonthly calendars of inservice courses one for teachers and one for teacher aides and assistants and writes and distributes a TEC Review publication with the up-to-date information from TEC.

TEC is the coordinating agency for other programs to benefit the instructional personnel in Dade County. These programs include a mini-grant program to provide monies to teachers for special projects; an intern program to assist in the placement of university interns n Dade County Public Schools; a professional library providing access to research for Dade County Schools personnel; an Urban Education program supporting teachers from selected schools; an internal certification program for teacher aides and assistants; add-on certification programs in mathematics, foreign language, middle school, science, and gifted; and special programs to enable teachers to apply for credit for educational travel and conferences and seminars.

The Dade-Monroe Teacher Education Center provides a model of how one large school district has begun to respond to the need for staff development activities for instructional personnel. The staff and the school site support representatives, have through training, dedication, and hard work, striven to respond to the needs of the clients. This dedication will continue as Dade County strives to lead teachers into an era of professionalism in which they will be decision makers in many areas including what they need in the area of training and staff development.

Chapter 6

THE EVALUATION OF STAFF DEVELOPMENT: A PROCESS, NOT AN EVENT

William C. Kyle, Jr.
Maria A. Sedotti

The evaluation of staff development is not a well developed area. The paucity of research associated with staff development suggests that systematic evaluation of staff development is the exception rather than the rule. This finding is distressing since staff development is a central component in nearly every proposal for improving education and the quality of schooling.

In this chapter, we have synthesized the factors that have contributed to the existing state. We have also synthesized essential criteria for the evaluation of staff development. In essence, staff development, and the potential career transitions of a novice teacher to a mentor, is a process, not an event. Thus, the evaluation of staff development must also be viewed as a process, not an event.

Historical Context

Traditionally, once teachers entered professional life, their continuing education was not only difficult to trace but, like teaching itself, professional development assumed a largely private and independent nature. Unlike preservice preparation, professional development has not been comprised of any specific content categories of required areas of study. Teachers' decisions to continue their professional education emanated largely from specific personal and professional circumstances (Lanier & Little, 1986).

Choices about what course of professional development to pursue, how much to pursue, or even whether to pursue any at all usually have been a matter of individual prerogative. Arends (1983) observed radically different profiles of professional development for teachers with comparable experience and teaching assignments. For example, a beginning high school biology teacher, characterized as an avid participant in continuing education, compiled over 1,600 hours in additional course work, independent research, conferences and workshops, and school-based decision-making groups over a three year period; another beginning teacher described as a reluctant participant, attended only 29 hours of continuing education during the same three year period. The private, eclectic, and apparently uncoordinated effort associated with continuing education in the past has made it difficult to ascertain its contribution to teacher knowledge, competence, and enthusiasm for teaching. Further, the effects of such personalized programs have been difficult to evaluate (Gall, Haisley, Baker & Perez, 1982; Stayrook, Cooperstein & Knapp, 1981); especially in light of the diverse functions served by professional development (Little, 1981; Moore & Hyde, 1981; Schlechty & Whitford, 1983).

113

Four factors have been primarily responsible for perpetuating the above conditions in our elementary and secondary schools:

1. There has been a lack of support for entry into teaching. The abrupt entry into the world of teaching has resulted in a "sink or swim" exercise for first year teachers. Typically, first year teachers assume the full responsibilities of the classroom from their very first day (Lanier & Little, 1986). Often, they assume the classrooms that the more experienced and tenured teachers do not want to teach. Thus, entry into teaching has been fundamentally an exercise of learning by experience, alone, in an unguided and unexamined trial and error mode. Such an entry into teaching conveys the impression that teaching can be mastered in a relatively short time, without any need for staff development. The alternative, meaningful mentoring relations between experienced and beginning teachers allows for mediated career entry. Beginning teacher programs allow novices to gain valued knowledge and skills; thus, this is the first rung on a "career ladder" that places a premium on cumulative mastery of professional expertise. (For a description of systematic induction activities in Australia and Britain, see Tisher, 1980).

2. Elementary and secondary school teaching has been relatively "careerless" (Dalton, Thompson & Price, 1977; Lortie, 1975; Sykes, 1983). Since little distinction has existed between beginning teachers and experienced teachers, the implicit assumption is that neither the daily work of teaching nor the structure of career opportunities requires extended education and/or support (Lanier & Little, 1986). This lack of progression in the teaching career is being confronted and challenged in over thirty states as of this writing. Proposals to produce career ladders should subsequently alter the nature and importance of staff development.

3. There has been a lack of collegial support for continued learning. Involvement in professional development with colleagues toward common goals is rare (Lanier & Little, 1986). Lortie (1975) reports that only 25% of the teachers in his survey had "much contact" with fellow teachers in the course of their work; almost half reported "no contact." In fact, research confirms that collaboration among teachers is fragile and frequently undermined by conditions of work. Yet, Little (1981) reports that schools in which teachers talked to one another about teaching, were regularly observed, and participated in shared planning and preparation were also schools in which teachers expected to learn from one another and with one another. Teachers report that collegial work adds to the pool of available ideas and materials, the quality of solutions to curricular problems, and teachers' own confidence in their collective and individual ability to refine their work (Bird & Little, 1981). Further, upon examining administrators' influence on teachers' professional conduct, Bird & Little (1981) report that collegial norms were most firmly

established when a "policy" of collaborative work was provided material support in the form of time, space, supplies, and assigned staff. Collegial support is essential for the success of mediated career entry into teaching, for the success of career ladder implementation, and for effective school based staff development.

4. Effective formal arrangements for staff development and continued learning have not existed. Research suggests that staff development has not been the product of coherent district policies. Further, it has not been integrated systematically with institutional priorities for curriculum and instructional improvements (Moore & Hyde, 1981). Most districts have a patchwork collection of diverse activities, rather than an orchestrated program of professional development and program improvement (Goodlad, 1984; Little, 1981; Moore & Hyde, 1981). In part, the lack of a well articulated, effective staff development program is attributable to the absence of teachers being educated for a professional teaching career beginning with a mediated entry, followed by the development of a career profile that incorporates expectations for future growth and development with attention to district policies and programs. In essence, districts have adopted the notion that experience is an adequate teacher of teachers and that those teachers so inclined will pursue their own personal interests. The time has come for districts, or regional educational cooperatives, to view staff development as an essential and integral process in the professional careers of teachers. A well articulated staff development program assures the successful implementation of district goals and curricular programs, while enabling individual teachers the opportunity to accomplish personal career goals and objectives related to long term professional growth and development.

Current Trends: Establishing the Value of Staff Development

TEACHERS NEED HELP! Teachers do not, however, need help due to a lack of skill, motivation, or commitment. Rather, teachers need help in order to keep pace with a society that is undergoing rapid social, political, and economic changes that are impacting the process of schooling.

Teachers are cognizant of the fact that our scientific and technological information base is expanding at an astonishing rate. Teachers are aware of the increase in the tempo of life and they realize that the tempo is likely to continue to increase. Thus, teachers know that they are going to have to prepare future citizens to be very skillful at information acquisition, handling, and processing. Teachers also know that they, and the future citizens they are preparing for entry into society as concerned adults, are going to have to be very adaptable in a rapidly changing global community. As a result, teachers are much more seriously accepting staff development as a necessary and potentially useful part of their professional career profile. Not surprisingly, then, most teachers are pressing for changes in the delivery of staff development. They want staff development to be continuous, relevant, and an integral part of their jobs (Verma, 1984).

Concomitantly, administrators are realizing that staff development is a powerful way in which to effect organizational change. Administrators are also realizing that continuous staff development programs that include evaluation and feedback are more likely to enhance teacher performance and productivity when compared to the traditional one-shot, fragmented, often irrelevant staff development activity.

In essence, teachers and administrators are realizing that you can no longer enter a classroom upon completion of a pre-service program and expect to be prepared for a lifetime teaching career void of continual updating and renewal. Thus, societal changes, scientific and technological advances, and recent research on effective schools, excellence in science teaching, and variables that contribute to instructional effectiveness have all aided in establishing the value of staff development. Teachers are demanding, and teachers deserve, high quality staff development programs.

Knowing that teachers are increasingly accepting staff development activities, we felt obligated to ask, "What do teachers expect as a result of participating in staff development activities?" Not surprisingly, teachers expect that participation in staff development activities will help them to become better teachers (Berman & McLaughlin, 1978; Fullan, 1982). Guskey (1986) states that:

> ...teachers are attracted to staff development programs because they believe these activities can potentially expand their knowledge and skills, contribute to their growth, and enhance their effectiveness with students... What they hope to gain through staff development programs are specific, concrete, and practical ideas that directly relate to the day-to-day operation of their classrooms. (p. 6).

Fortunately, the expectations of teachers correlate well with the generally accepted notion of staff development as the "provision of activities designed to advance the knowledge, skills, and understanding of teachers in ways that lead to changes in their thinking and classroom behavior" (Fenstermacker & Berliner, 1984, p. 283). Staff development, then, is a process of change. Thus, the evaluation of staff development must also be a process, not an event.

Evaluation: A Luxury or Necessity?

Staff development activities are involving the time and resources of many individuals while placing excessive demands on school system budgets (Fenstermacker & Berliner, 1984). To date, however, the demands have been for the development and delivery of specific activities, with little funding for evaluation. Baden (1982) notes that often evaluation is used "only to justify external funding or to request additional funding rather than as a tool for decision making and process modification" (p. 39). This practice must change. Appropriate evaluation designs are necessary in order to assess the worth and effectiveness of program activities, as well as to provide teachers with feedback regarding implementation of program activities.

Verma (1984) asserts that evaluation of staff development "is the assessment and judgement of the results of both planning and implementation" (p. 10). Thus, while planning, implementation, and evaluation may be conducted independently of one another, all three components are necessary for any staff development endeavor. The evaluation process should contribute to decision making, modification, and improvements in staff development programs, as well as provide teachers with direct feedback.

Evaluation is not a "luxury." Just as funds are allocated for planning and implementation of staff development activities, funds must be allocated for evaluation. If evaluation is a necessity, "What are the components of evaluation?" and "How can evaluation be accomplished?"

The Evaluation Process

In the broadest sense, Fenstermacker and Berliner (1984) state that evaluation is "the appraisal of the worth, success and merit of a phenomenon or event" (p. 287). Therefore, the evaluation of staff development programs should appraise all three dimensions (the worth, merit, and success) throughout the staff development process. Table 1 provides a description of the dimensions and conditions of the evaluation perspective conceptualized by Fenstermacker and Berliner in 1983.

The evaluation perspective proposed by Fenstermacker and Berliner can be anticipatory in nature (forward-looking evaluation) or after the fact (backward-looking evaluation). Ideally, administrators and policymakers should be utilizing forward-looking evaluation. Such assessments would be concerned with anticipating or predicting the liklihood of the worth, merit, and success of specific activities and/or long-term programs. Such an assessment would determine whether an activity should be undertaken. This perspective contrasts with the more typical backward-looking evaluation in which an assessment is made as to whether an already completed activity was worthwhile, meritorious, and successful. In essence, the more frequently

Table 6-1. The Dimensions and Conditions of the Evaluation Perspective

Dimension	Conditions	Explanation
Worth	Theory	Activity is a contribution to the goals of a selected educational theory
	Moral	Activity is morally acceptable and is fair and unharmful to participants
	Evidence	Activity based on available evidence from research, evaluation, or critical experience, and includes procedures for determining success and merit
Merit	Sensibility	Activity is consistent with plans teachers have for their work, fits well with classroom circumstances, is timely, and is valued for its utility
	Variability	Activity permits variation in the ways recipients participate and in ways recipients use what they learn
	Incentives	Activity provides positive incentives to recipients for their participation, both during the activity and during its implementation in the classroom
	Maintenance	Activity provides systemic and clinical support during the activity and during the period of implementation in the classroom
Success	Objectives	Activity has clearly stated objectives known to both providers and recipients and clearly related to work demands on the recipients
	Instructor	Activity staffed by providers who have competence in teaching adults, and the instructor is able to model what it is proposed that recipients do in their work settings
	Diagnosis	Activity accounts for the needs, interests, and abilities of the recipients
	Application	Content of activity is sufficiently concrete to make its application to the classroom clear
	Duration	Activity provides sufficient time for recipients to learn, practice, master, and apply the content imparted

From: Fenstermacker, G. D. and D. C. Berliner (1983). A conceptual framework for the analysis of staff development. Santa Monica, CA: Rand Corporation (p. 17).

forward-looking evaluation can be utilized to ensure that as many conditions as are applicable to a particular activity are fulfilled, the more likely it will be that the activity will be viewed by the participants as valuable. Forward-looking evaluation begins as soon as the district, curricular, and/or individual needs are identified. The evaluation process should continue throughout the planning and implementation phases.

Baden (1982) developed a six step evaluation model that would be a useful guide for structuring the evaluation process. His model involves a needs assessment, the setting of measurable objectives, and the delivery of services tied to the objectives, as follows:

Step One

> Identify the content to be evaluated through a needs assessment process in which (ideally) representatives from all potential participant groups are involved. Develop program goals as well as specific performance objectives to be addressed by the activity. Note: this step can be contrasted to a traditional program in which only a title is provided and "evaluation" is limited to participant reaction to the presenter.

Step Two

> Identify the appropriate evaluation questions.

Step Three

> Design, select, and administer the appropriate evaluation instruments or procedures.

Step Four

> Analyze the data in terms of prescribed standards and criteria so that judgements can be made in terms of the progress toward achievement of the established objective(s).

Step Five

> Disseminate the results of the evaluative process so that all participants are informed of progress toward achievement of the established objective(s).

Step Six

> Make rational decisions based on the evaluation process so that program activities become more effective in the future.

The apparent simplicity of using Fenstermacker and Berliner's Evaluation Perspective in a forward-looking mode in conjunction with

Baden's Evaluation Model may be evoking a sense of skepticism on the part of some readers. You might be asking, "How will I know whether a specific staff development activity was successful?" This is a logical question for evaluation activities in which the goal is to make empirical decisions about what happened. The nature of staff development activities, however, can not afford to rely only on evaluation about what happened. By assessing staff development proposals using the dimensions and conditions of the evaluation perspective in a forward-looking mode, the evaluator is able to ascertain whether that proposal is likely to be worthwhile, meritorious, and successful. Thus, staff development activities do not have to be completed in order to determine their value. Furthermore, most staff development programs are only evaluated on the participants' satisfaction with the program. Does that imply that participant satisfaction is the most important effect to achieve?

It should be evident, then, that knowing a proposal meets the conditions of worth, merit, and possesses the likelihood for success is a far more sophisticated approach to the planning and evaluation of staff development programs. If we agree that staff development is a set of activities to advance the knowledge, skills, and understanding of teachers that lead to changes in their thinking and classroom behavior, then the evaluation model proposed by Baden provides a means to assess those changes. Therefore, a synthesis of the Fenstermacker and Berliner Evaluation Perspective and Baden's Evaluation Model has the potential of ensuring that staff development programs are functional, time-efficient and cost-effective. Additionally, all participants should be provided with understandable and useful information regarding any program effects. Implementing such a process of staff development evaluation would enable administrators and policymakers to make rational decisions with regard to the nature, organization, and desired outcomes of staff development activities.

Measuring and Assessing Outcomes

It should be apparent that utilizing the Evaluation Perspective in conjunction with the Evaluation Model is different from traditional evaluation notions where the evaluator is merely interested in ascertaining the degree of correlation or discrepancy between planned outcomes and realized outcomes. Traditional evaluation is only interested in assessing the degree of success or failure of program implementation regardless of the worth or merit of the program. Imagine the successful implementation of a mnemonic memory model program offered to chemistry teachers designed to enhance the liklihood of their students being able to memorize the periodic table! Even if the implementation was successful, what is the worth and merit of such a program and the subsequent implementation? Hence, the goal of staff development evaluation is to ensure that the conditions for worth, merit, and success are addressed. As such, Fenstermacker and

Berliner (1984) argue that the evaluation conditions are a proxy for the assessment of outcomes. That is, the outcomes will be attained if the conditions are met.

Realistically, once staff development planners and/or individual teachers have established the worth and merit of the program activities, they may wish to ascertain the degree of success. Baden recommends that the following five evaluation concerns be addressed:

1. Was the content of the activity informative and useful to the participants?

2. Was the presenter of the activity effective?

3. Did the participants in the activity exhibit the behavior change as defined by the objectives?

4. Did the participants' behavior in their classrooms change as a result of the activity after a period of time?

5. Did the students of the participants change as a result of altered teachers' behavior?

Each of the above questions enables the evaluator to make backward-looking assessments regarding the program delivery and implementation. If these questions are addressed after the worth, merit, and likelihood for success have been established, then useful information will be gleaned that will assist future planning, implementaion, and maintenance.

Whenever backward-looking evaluation is utilized, it is important to select instruments that reflect program goals and objectives. If appropriate, evaluation instruments should be able to measure the intended outcomes that the program activities purport to impact upon teachers and/or students. Data can be collected using: rating scales; personal interviews; classroom observations; video and/or audio tapes; questionnaires; pre- and/or post-tests of student achievement, attitudes, process skills, analytic skills, creativity, etc. that assess program goals and objectives; teacher unit and lesson plans developed as a result of participation in a curriculum development workshop; in essence, the list is endless. McDonald (1982) states that "the lack of ideas about ways of measuring different kinds of effects is a mental obstacle to visualizing the range and variety of effects which our programs might have" (p. 8). In essence, the nature of the data collected is limited only by the creativity and insightfulness of the evaluator, the funding available for data collection and analysis, and the condition that an activity cannot be discarded as completely unsuccessful when it was otherwise considered worthwhile and meritorious.

A major backward-looking evaluation concern is whether it is appropriate to apply the criterion of having a demonstrable student effect to a particular program. Such assessment should only occur if program developers and evaluators can identify as precisely as possible when they expect a student effect, what the student effect will be, and what the relative magnitude of the effect is likely to be. If the above issues cannot be addressed in a concrete and specific way, then staff development evaluation should not be assessing student effects for that particular activity and evaluation should focus on other components of the program that can be measured for effectiveness. Staff development evaluators should recognize that most program activities are fairly limited in scope. Even if we do expect effects on students, those gains will be modest - thus, evaluation procedures should be realistic and instruments should be sensitive enough in order to detect such modest gains.

We feel compelled at this time to dispel the fallacy that the success of a staff development activity can be ascertained by assessing student performance on standardized tests. Most standardized achievement tests measure changes which have occurred over extended periods of time and are not designed to assess the effects of specific program activities. Therefore, assessing student performance using standardized test measures is not synonymous with the process of activities designed to assess the increase in knowledge, skills, and understanding of teachers in ways that lead to changes in their thinking and classroom performance. This is not to imply that standardized tests may never be used - occasionally such tests will be a valid indicator of an expected effect. Thus, the key questions are: "What changes are expected?" and "Have the data collection instruments been selected on the basis of their validity for measuring what is purported to occur?"

As can be seen, the evaluation of staff development programs is a multifarious process. This process is not limited to the traditional assessment of the presenter at the end of a workshop; or, to the administration of a standardized test at the end of the year, the results of which would probably include hundreds of intervening effects in addition to that being "measured." A combination of forward-looking and backward-looking procedures, however, would ensure that the process of staff development activities are continually assessed from the planning stage to the actual implementation of program activities. This process would correlate with teachers' desires for staff development programs that are continuous, relevant, and an integral part of their job.

The Context of Staff Development

Recently, the context or environment that ensures the success of staff development has received considerable attention. A chapter focusing on evaluation would not be complete without synthesizing such factors.

Berman and McLaughlin (1978) concluded that the major factor affecting success of staff development efforts related to educational innovations was administrative support - from principals and superintendents. Since staff development is an integral component of the process of curricular implementation, the reader may wish to refer to the following studies (Fullan & Pomfret, 1977; Hall et al., 1975; Hall & Louchs, 1976; Kyle et al., 1986; Kyle, Bonnstetter & Gadsden, 1987, in press).

Little (1981) found that staff development efforts were most successful in environments where a norm of collegiality and experimentation existed. Her findings reveal that staff development has the greatest impact on teaching in schools where teachers share their ideas about instruction and try out new techniques in their classrooms.

Organizational characteristics of staff development also significantly affect the value of the activity for the participants (Fenstermacker & Berliner, 1983). The four factors that appear to be the most crucial organizational determinants regarding the value of staff development are: How is it initiated? For what purpose? Who participates? and, How is participation decided? Fenstermacker and Berliner (1983) have developed a staff development profile that enables evaluators to visualize the nature of a particular activity. Consider the following examples (see Figure 6-1):

a. The administrators of a school district decide that a new K-6 science curriculum is needed in order to prepare students for life in the 21st Century. They contact a curriculum development team from a nearby university that has recently developed a K-6 curriculum that focuses on applications of scientific concepts and science-technology-societal issues. The administration decides that this curriculum will be implemented in the autumn. In addition, the administration decides that all teachers will attend a week long staff development program focusing on the philosophy of the curriculum and how to successfully implement the program in their classrooms. Teachers will have the opportunity to process each activity that they will be expected to instruct during the following year.

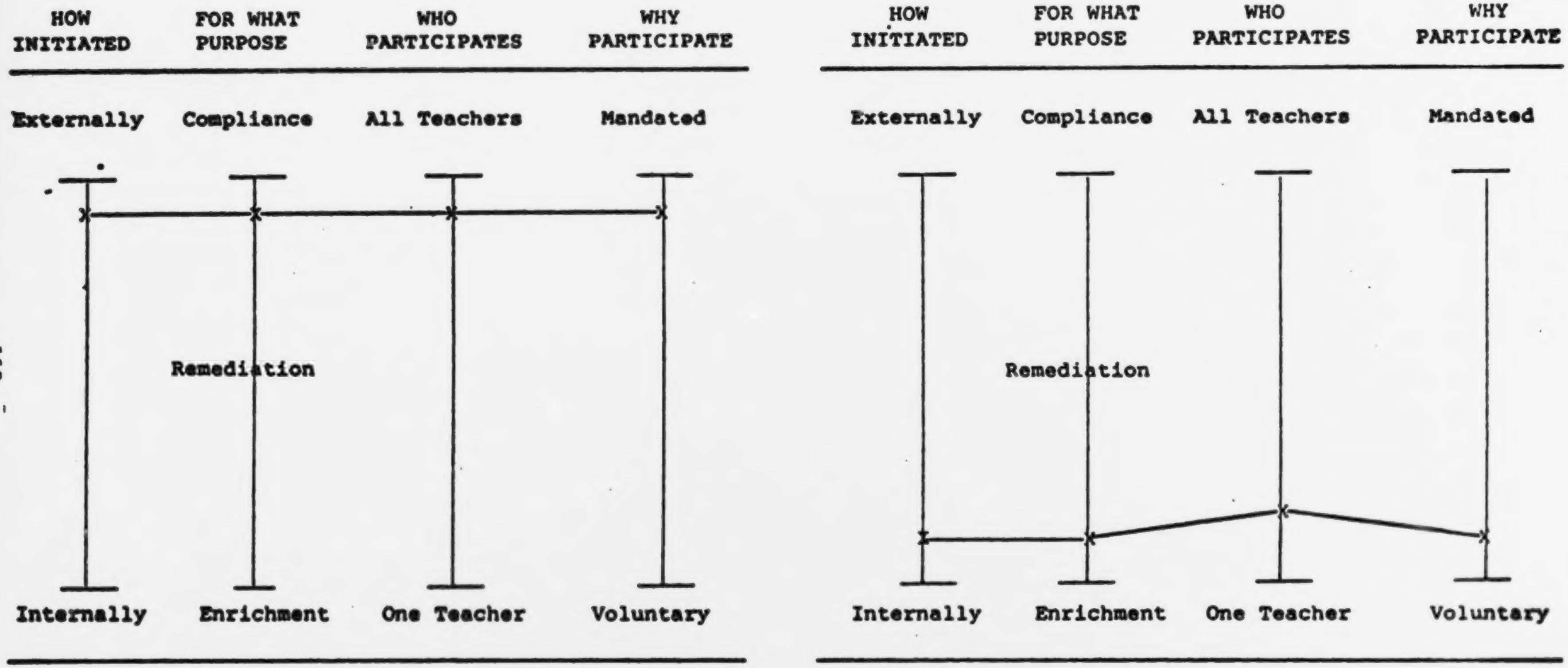
b. After attending an NSTA National Convention, a small group of elementary teachers get together to investigate current trends in science education. After their first meeting they send a memorandum to the middle school and high school science teachers inviting them to attend their next meeting. This internally organized group of K-12 teachers orders the following NSTA publications: the Focus on Excellence monograph series, the recent NSTA Yearbooks, and Research Within Reach:: Science Education. The teachers begin to identify, adapt, and develop S-T-S units and activities that can be integrated into their own classrooms. Within a year they make the materials available to any other interested teachers in the district. Recognizing the tremendous interest that teachers begin to show for the

> science cadres efforts, the administration invites the cadre members to sponsor a half-day seminar for teachers in the district regarding their investigative efforts to date and the nature of the curricular materials that they have been integrating into their classrooms. After the session, teachers request and obtain administrative support to form a K-12 Science Committee to review the existing curriculum and recommend district compliance to the philosophical perspective initiated by the science cadre. Within four years the district implements a locally developed science curriculum that addresses all of the current concerns in science education.

In general, the more bottom-up a staff development profile is conceptualized, the easier it is to meet the conditions previously established for worth, merit, and success. This does not imply that bottom-up staff development conceptualization is better than top-down conceptualization, per se. Rather, the issue is that the conceptualization of any staff development activity affects the perspective in which the worth and merit is assessed and ultimately impacts the degree of success. Thus, staff development planners may wish to consider the profile of staff development activities when assessing the contributions to the knowledge, skills, and understanding of the participants.

Top-down initiation is often necessary in order to comply with state mandates. Teachers can become involved in the decision making process, however, to ensure that the conditions for worth and merit are addressed. This is imperative since the teachers are the ultimate change agents in the classroom. For example (as reported by Kyle et al., 1986, 1987, in press), in 1983 the Richardson Independent School District (TX) conducted an internal audit to assess the status of science education in the district. The audit was in anticipation of a new state mandate that would require an inquiry-oriented, process-approach to the teaching of science, as well as grade level time requirements. In response to the data, and to national reports advocating a broadening of the science education curriculum to address the needs of all students, the district established a committee of teachers, administrators, community members, and outside consultants to identify, implement, and evaluate a new K-6 science curriculum. The most important component of the entire curriculum revision process in Richardson, and the key to their program being selected as a Texas State Exemplar in NSTA's Search for Excellence in 1985, is the staff development that teachers and principals received in conjunction with program development and implementation (see, Kyle, Bonnstetter & Gadsden, 1987, in press).

Finally, it is worth noting that teachers in Richardson I.S.D. and key teachers of exemplary science programs (Bonnstetter, Penick & Yager, 1983) are extremely positive about the nature of the staff development activities that they experienced throughout the implementation of such programs. By examining the type of staff development experience found in exemplary programs, several characteristics were consistently identified:


HOW INITIATED
FOR WHAT PURPOSE
WHO PARTICIPATES
WHY PARTICIPATE
Externally
Compliance
All Teachers
Mandated
Remediation
Internally
Enrichment
One Teacher
Voluntary
HOW INITIATED
FOR WHAT PURPOSE
WHO PARTICIPATES
WHY PARTICIPATE
Externally
Compliance
All Teachers
Mandated
Remediation
Internally
Enrichment
One Teacher
Voluntary

a. A staff development profile in which all teachers will participate in workshops related to a curriculum implementation.

b. A staff development profile in which a group of teachers investigate current trends in science education and begin to develop curricular materials.

Figure 6-1. Contrasting Staff Development Profiles

a. The staff development associated with program implementation must be well articulated and well developed. A longitudinal plan for staff development activities must be identified. The activities must be continual and must provide opportunities for program assessment and feedback. The traditional "one shot" approach to staff development and associated program implementation is not effective.

b. Strong administrative support is imperative--in terms of time allocation for staff development activities, as well as a fiscal commitment.

c. A local subject matter specialist in a central role facilitates communication and ensures program continuity.

d. An atmosphere of personal involvement in "doing" key components of the implementation and staff development activities is necessary. Simply discussing curricular changes will not effect change in the classroom. Teachers must feel a sense of ownership to the curriculum and must realize that their implementation efforts are valued by their administrators.

Exemplary programs start with, and continue to use, an on-going assessment of teacher, student, and program needs to provide the focus for future staff development programs. A staff development program that is derived from such a procedure has a much better chance of effecting positive curricular change.

School districts must begin to recognize the value and need for effective staff development programs. Districts should contractually provide for a minimum of eight to ten staff development days per school year in order for coordinated planning, implementation, and evaluation of curricular programs. These days should be in addition to the usual professional days that are recognized by districts as individual teacher staff development days. Districts should, however, increase fiscal support for such valued activities as professional travel to workshops, conventions, and seminars. Finally, unless districts provide for the professional resources that are necessary for teachers to engage in professional activities, they cannot expect to receive professional services. Districts should have professional libraries complete with curricular materials, professional journals, and professional publications to ensure that all teachers in their district have access to the most recent curricular developments and research related to educational effectiveness.

Conclusion

Effective formal arrangements for staff development and the continued learning of teachers are beginning to be articulated. While we have been previously concerned with staff development and the evaluation of such activities in a global school improvement sense, the criteria for the evaluation of staff development activities can be applied on an individual basis as well. The establishment of personal career ladders enables individual teachers to be actively engaged in a number of district level activities, while simultaneously fulfilling personal career aspirations. Thus, over a number of years, an individual profile would consist of a number of top-down and bottom-up activities. Such activities would include, but not be limited to: all required staff development sessions sponsored by the district; organizing and leading a workshop; service on a curricular writing committee; membership and participation in local, regional, and national professional orgainzations; participation in educationally beneficial travel experiences; completion of a college/university course, workshop, seminar, or training session that exceeds compensatory requirements; publications of various kinds; and participation in special activities such as NSTA's "Every Teacher a Researcher." Teachers and administrators should work cooperatively to appraise the worth, merit, and liklihood of success of each proposed activity or long-term project.

The teaching profession is fortunate enough to have many different kinds of people possessing many different skills. Staff development programs need to find ways to recognize and honor the differences among teachers more than they have in the past. It is imperative that career ladders and personalized staff development evaluation profiles recognize not only district goals and policies, but individual strengths and interests as well.

Finally, it is apparent that a new level of university and school partnership must be established in order for school staff development programs to be effective. Cooperative beginning teacher programs should be the first rung on a career ladder that places a premium on cumulative mastery of professional expertise leading toward mentor status. Teachers are shouting for well articulated, effective staff development programs that address their needs. It is time for school districts and universities to respond to the needs of teachers with the quality programs that they deserve.

REFERENCES

Arends, R. "Teachers as Learners: A Descriptive Study of Professional Development Activities." Paper presented at the annual meeting of the American Educational Research Association, Montreal, Quebec, Canada, 1983.

Baden, D. J. "A User's Guide to the Evaluation of Staff Development." In F. J. McDonald, W. J. Popham & D. J. Baden, *Assessing the Impact of Staff Development Programs*. Syracuse, NY: National Council of States on Inservice Education, 1982.

Berman, P. & M. W. McLaughlin. "Implementing and Sustaining Innovations: Federal Programs Supporting Educational Change (Vol. 8)." Santa Monica, CA: Rand Corporation, 1978.

Bird, T. D. & J. W. Little. "Finding and Founding Peer Coaching." Paper presented at the annual meeting of the American Education Research Association, Montreal, Quebec, Canada, 1983.

Bonnstetter, R. J., J. E. Penick & R. E. Yager. *Teachers in Exemplary Programs: How Do They Compare?* Washington D. C.: National Science Teachers Association, 1983.

Dalton, G. W., P. H. Thompson & R. L. Price. "The Four Stages of Professional Careers: A New Look at Performance by Professionals." *Organizational Dynamics* 5: (1), 19-42, 1977.

Fenstermacker, G. D. & D. C. Berliner. "A Conceptual Framework for the Analysis of Staff Development." Santa Monica, CA: Rand Corporation, 1983.

Fenstermacker, G. D. & D. C. Berliner. "Determining the Value of Staff Development." *The Elementary School Journal* 85: (3), 281-314, 1984.

Fullan, M. *The Meaning of Educational Change*. New York: Teachers College Press (Columbia University), 1982.

Gall, M. D., F. B. Haisley, R. G. Baker & M. Perez. "The Relationship Between Inservice Education Practices and Productivity of Basic Skills Instruction." Eugene, OR: University of Oregon, Center for Educational Policy and Management, 1982.

Goodlad, J. *A Place Called School*. New York: McGraw-Hill, 1984.

Guskey, T. R. "Staff Development and the Process of Teacher Change." *Educational Researcher* 15: (5), 5-12, 1986.

Hall, G. E. & S. F. Loucks. "A Developmental Model for Determining Whether or not the Treatment Really is Implemented." Austin, TX: Research and Development Center for Teacher Education (The University of Texas at Austin), 1976.

Hall, G. E., S. F. Loucks, W. L. Rutherford & B. W. Newlove. "Levels of Use of the Innovation: A Framework for Analyzing Innovation Adaptation." *Journal of Teacher Education* 26: (1), 52-56, 1975.

Kyle, W. C., Jr., R. J. Bonnstetter, T. Gadsden, Jr., J. A. Shymansky, S. McCloskey & B. A. Fults. "Implementation and Evaluation of an Exemplary Elementary Science Program." A paper set presented at the annual meeting of the National Association for Research in Science Teaching, San Francisco, CA (ERIC Document No. ED 270330), 1986.

Kyle, W. C., Jr., R. J. Bonnstetter & T. Gadsden, Jr. "Implementation and Evaluation of an Exemplary Science Program: A Longitudinal Analysis." A paper set presented at the annual meeting of the National Association for Research in Science Teaching, Washington, D. C., 1987.

Kyle, W. C., Jr., R. J. Bonnstetter & T. Gadsden, Jr. "An Implementation Study: An Analysis of Elementary Student and Teacher Attitudes Toward Science in Process-Approach vs. Traditional Science Classes. *Journal of Research in Science Teaching*, (in press).

Lanier, J. E. & J. W. Little. "Research on Teacher Education." In M. C. Wittrock (Ed.), *Handbook of Research on Teaching* (3rd Edition, pp. 527-569). *New York: Macmillan Publishing Co.*, 1986.

Little, J. W. "School Success and Staff Development: The Role of Staff Development in Urban Desegregated Schools. Boulder, CO: Center for Action Research, 1981.

Lortie, D. *Schoolteacher*. Chicago: University of Chicago Press, 1975.

McDonald, F. J. "Criteria and Strategies for Assessing the Impact of Staff Development Activities." In F. J. McDonald, W. J. Popham & D. J. Baden, *Assessing the Impact of Staff Development Programs*. *Syracuse, NY:* National Council of *States on Inservice E*ducation, 1982.

Moore, D. R. & A. A. Hyde. "Making Sense of Staff Development. An Analysis of Staff Development Programs and Their Costs in Three Urban School Districts." Chicago: Designs for Change, 1981.

Schlechty, P. C. & B. L. Whitford. "The Organizational Context of School Systems and the Functions of Staff Development." In G. Griffin (Ed.), Staff Development (82nd Yearbook of the National Society for the Study of Education, pp. 62-91). Chicago: University of Chicago Press, 1983.

Stayrook, N., R. A. Cooperstein, M. Knapp. "The Characteristics of Teacher Corps Staff Development Programs and Their Effectiveness." Menlo Park, CA: SRI International, 1981.

Sykes, G. "Contradictions, Ironies, and Promises Unfulfilled: A Contemporary Account of the Status of Teaching." Phi Delta Kappan 65: (2), 87-93, 1983.

Tisher, R. "The Induction of Beginning Teachers." In E. Hoyle & J. Megarry (Eds.), The Professional Development of Teachers (World Yearbook of Education, pp. 69-84). London: Kogan Press, 1980.

Verma, S. "Staff Development: A Systematic Approach." Education Canada 25: (3), 9-13, 1984.

Chapter 7

A PLANNER'S GUIDE TO INSERVICE

Barbara S. Spector

Categories of information needed by inservice decision makers are organized into a framework in this chapter. Questions are presented, followed by a list of options from which to select responses. These options were derived from the research presented in the preceding chapters and may be adopted, adapted, or used as a stimulus to develop other options. By mixing and matching components herein, in response to local staff development structure and circumstances, one can generate a check list tailored to a specific setting that can guide the development of an action plan for an area's inservice programming. Individuals and organizations can increase their potential for successful inservice by establishing systematic procedures to make the decisions engendered in this framework prior to the time specific funding opportunities surface.

Which decisions engendered in this framework a reader will make and which decisions will already be made for the reader will depend on whether one is a permission giver, enabler, or practitioner, and whether one is housed in a legislature, federal or state funding agency, a school district, or in a single school.

The questions are arranged under these catagories:

- I FUNDING
- II TARGET AUDIENCE
- III CONTENT AND DELIVERY
- IV EVALUATION

I. FUNDING

A. Who will provide the funding for the inservice?

1. Federal agency
2. State legislature
3. State education agency
4. Local education agency
5. Higher education institution
6. Private foundation

7. Community organization
8. A combination of two or more of the above

B. What parameters will the funding agency set?

1. Specify group to control the expenditure of the funds
2. Specify target audience
3. Specify type of initiative to be supported
    a. Specify delivery system
    b. Specify content
    c. Specify instructional strategy to be used
4. Specify characteristics of instructors

C. Which of the collaborating agencies will control the expenditure of funds?

1. State education agency
2. Local school board
3. Individual school
4. Institution of higher education
5. Informal education agency (e.g., museum, aquarium, academy of science)
6. Community organization

D. How will the money be allocated?

1. By competition
2. By formula
    a. Number of students in the audience population
    b. Number of teachers in the audience population
    c. Number of "out of field" teachers
    d. Number of people teaching a specific discipline
    e. Evenly among all potential participants

3. By formula plus requiring that a plan of use be approved by funding source or its agent

4. By request on first-come first-served basis

E. How will the inservice be initiated?

1. Top down

2. Bottom up

3. Externally

    a. By state agency

    b. By institution of higher education

    c. By community group

4. Internally

    a. By school board

    b. By district administration

    c. By staff development

    d. By school

    e. By department

    f. By teachers

F. Who will collaborate in the decision making at all stages of the inservice program?

1. Administrators

    a. Supervisors

    b. Staff development personnel

    c. School site administrators (e.g., principal)

2. Teachers

3. University faculty

    a. Science education

    b. Science

    c. Engineering

4. Community people
    a. Business/industry representatives
    b. Parents
    c. Special interest groups
5. Representatives of the funding agency

G. What decision-making procedures will collaborators use?

1. Consensus
2. Majority rules
3. Percentage of those present rules
4. General trend of discussion as perceived by chair
5. Arbitrarily by chair

II. TARGET AUDIENCE

A. What will be the geographic scope of the inservice program?

1. Nationwide
2. Statewide
3. Regional division within the state
4. Two or more school districts collaborating
5. One school district
6. Two or more schools within one district collaborating
7. Two or more science departments collaborating
8. One school
9. One department in a school
10. Individuals from different areas forming a temporary group (e.g., university workshop)
11. Individuals from science teachers' association

B. How will participation be determined?

- 1. Mandated
    - a. By whom
        - (1) State education agency
        - (2) School board
        - (3) Central district administration
        - (4) Principal
        - (5) Department chair
- 2. Voluntary
    - a. What criteria will be used for selection?
        - (1) First come, first served
        - (2) Membership in a particular group (see next

C. What will be characteristics of the participants?

- 1. Awards winners (e.g., SESE, Presidential)
    - a. National
    - b. State
    - c. Local
- 2. Teaching assignment
    - a. All teachers in district
    - b. Select teachers in district
        - (1) Elementary
            - (a) All grades
            - (b) Grade taught
        - (2) Middle/junior high school
        - (3) Senior high school
            - (a) "In-field" teachers
            - (b) Certified but out of date

(c) Certified, up to date, wanting further knowledge

(d) Science discipline presently taught

(e) Science discipline that will be taught in the future

(f) Level of science discipline taught

i. Remedial

ii. General

iii. Honors

iv. Advanced

v. Advanced placement

(g) "Out-of-field" teachers

(h) Certified in one science becoming certified in another science

(i) Certified in non science becoming certified in one science

3. Teachers' perceptual screens

a. Teachers with certain viewpoints

(1) Humanistic

(2) Custodial

b. Teachers with specific perspectives on

(1) Change

(a) Actively seeking variety

(b) Resistant change

(2) Teaching

(a) Gets easier each year because it is repititious

(b) Remains challenging regardless of past years' experience

- (3) Institutional setting
  - (a) Norm of experimentation (try new things)
  - (b) Norm of punishment for failure
  - (c) Norm of individuation
  - (d) Norm of collegiality (sharing)
  - (e) Relaxed non-threatening climate
    - i. Free to criticize and express opinions
    - ii. Trust and mutual respect pervade
- (4) Teachers' personal characteristics
  - (a) Assertive
  - (b) Internal locus of control
  - (c) Surgent - leadership

D. What extrinsic incentives have potential to encourage teachers to become committed to inservice programs?

- 1. What financial gains are viewed by teachers as incentives?
  - a. Release time (use school time for inservice while the district pays for a substitute)
  - b. Stipend (pay teachers to use their own time for inservice)
  - c. University or school district credits leading to an increase in salary
    - (1) If a stipend is selected, how will the amount be determined?
      - (a) Teachers' union
      - (b) Outside funding source
      - (c) School board
      - (d) Teacher's base salary

2. What aspects of a school schedule are viewed by teachers as incentives?
    a. Extra planning period to work on new venture
    b. Release from cafeteria, hall, or bus duty
    c. Limited number of class preparations
    d. Specific classes scheduled into particular periods
    e. Planning time scheduled into particular period
    f. Teach a preferred course
    g. Avoid teaching an undesirable course
3. What physical things are viewed by teachers as incentives?
    a. Desirable room assignment (not "float")
    b. Have special work areas
        (1) green house
        (2) animal room
        (3) teacher research area
        (4) adequate storage space
        (5) adequate preparation space
4. Additional equipment
5. Additional materials

III. CONTENT

A. How will needs be assessed?

1. Written questionnaire
    a. Checklist
    b. Open ended

2. Oral interviews
    a. Individual
    b. Small group
    c. Structured
    d. Unstructured
3. Participant observation
4. Analysis of students' performance on standardized tests
5. Analysis of teachers' performance on tests assessing depth and recency of knowledge in science (e.g., for merit pay or career ladder advancement)
6. Analysis of teacher's performance during administrators' classroom observations

B. Who will design the assessment?

1. University personnel
2. Professional staff development personnel
3. Science supervisor
4. School personnel seeking specific information
5. Science teachers' association
6. Community group

C. Who will be asked for perceptions of needs?

1. Teachers
2. Administrators (district or school site)
3. University science educators
4. University scientists
5. Community representatives from:
    a. Parent groups
    b. Business/industry
    c. Special interest groups

D. Who will conduct the needs assessment?

1. Funding agent
2. Person writing a proposal to a funding source
3. School district personnel
    a. Teachers
        (1) Special building representatives
        (2) Union leaders
    b. Administrators (district or school site)
4. University personnel
5. Community representatives

E. For what will the needs assessment be used?

1. To design total inservice program
2. To design individual inservice initiatives
3. To respond to needs of a specific group (e.g., local science teachers' association's request for inservice)

F. What will be the purpose of the inservice?

1. Compliance
2. Remediation
3. Enrichment
4. Develop products (e.g., county-wide curriculum, test)
5. Alter the organization's
    a. Psychological climate
    b. Structure
    c. Decision-making procedures
6. Systematic induction of a new teacher

7. Institute team teaching
8. Develop cadre of trainers
9. Implement differentiated staffing
10. Develop leaders
11. Introduce new topic
12. Implement new curriculum
13. Reorient existing curriculum
    a. By infusion
    b. By adding on
14. Increase individual teacher's competence regarding
    a. Accrued body of scientific information
    b. Science process skills
    c. Laboratory safety skills
    d. Awareness of new instructional aids
    e. Science teaching methods
    f. Decision making models
    g. Group processing skills
15. Provide teacher certification

G. Which staff development model will guide systematic planning?

1. Organization based models
    a. AAIM model
    b. School-based model
    c. Organizational development model
    d. Social system model
2. Individual based models
    a. A behavioral model
    b. Humanistic model

        - c. Concerns based adoption model
        - d. Developmental model
    - 3. Role based models (static)
        - a. Independent study model
        - b. Competency based model
        - c. Educator centered model
    - 4. Trainer based models (dynamic)
        - a. The exchange model
        - b. Linking agent model
        - c. Advocacy

H. How will administrative support be demonstrated?

- 1. Time
- 2. Materials
- 3. Human resources
- 4. Principals participate with teachers

I. What time will be allocated to a specific initiative?

- 1. Frequency of contact
- 2. Number of contact hours
    - a. For each session
    - b. For total initiative
- 3. Time of the year
- 4. Time of day

J. How will instruction be job related?

- 1. Do actual activities to use with children
- 2. Topics are selected from syllabus for children's courses

3. Adult level content presented with methods to convert information from adult level to student level

4. Provide processes to enhance the working environment

5. Provide processes to enhance individual well being

K. How will content be determined?

1. Mandate
2. By participating teachers' expressed needs
3. Course outline for what the teacher will teach
4. Instructor's choice
5. Community demand

L. What will guide the selection of topics?

1. State standards (frameworks, minimum competencies, indicators of excellence)
2. District standards (goals, objectives, scope and sequence, course guides)
3. Textbook
4. Special interest of the participants

M. What delivery system(s) will be used?

1. University degree
    a. Undergraduate
    b. Graduate
2. Individual university courses/workshops
3. University non-credit
4. School district credit
5. Non-credit
    a. Workshops
    b. Professional conferences
    c. Informal meetings
    d. Interschool site visits
    e. Visits to other teacher's classes

N. Where will instruction occur?

1. At a school site
2. At a university campus
3. In the field
    a. In a natural environment
    b. In a human made environment
4. In a classroom
5. In a laboratory
6. On a ship (e.g., research vessel)
7. On a bus (e.g., mobil laboratory or museum)

O. What teaching strategies will be used for instruction?

1. Lecture
2. Demonstration
3. Discussion
4. Symposia
5. Seminar
6. Fieldwork
7. Practicum with children
8. Individual research with scientist
9. Group work with scientist
10. Direct research with children
11. Guest presentations
12. Hands on
13. Coaching
14. Group instruction
15. One to one instruction
16. Video tapes

    17. Audio-tutorial
    18. Peer teaching
    19. Role play
    20. Analyzing scenarios
    21. Media

P. How will interactions among participants be facilitated?

    1. Using androgogical approaches
    2. Peer teaching
    3. Team assignments among participants
    4. Group work in sessions
    5. Quality circles

Q. What reasoning will guide the instructional design?

    1. Inductive reasoning
    2. Deductive reasoning
    3. Combination of inductive and deductive reasoning

R. How will a person who can meet the needs be identified?

    1. Contact an area university science education department
    2. Contact an area university science department
    3. Contact an area university engineering department
    4. Contact a state education agency consultant
    5. Contact national, state or local professional associations
        a. Association for the Education of Teachers in Science
        b. National Association for Research in Science Teaching
        c. National Association of Science Supervisors
        d. National Science Teachers Association

6. Contact professional societies
    a. Marine Technology Society
    b. American Chemical Society, etc.
    c. American Association for the Advancement of Science
7. Contact community organizations
8. University or district professional staff developers
9. District science supervisors

S. How will instructors be selected?

1. Persons who model good teaching practices
2. Persons with positive views of teachers
3. Persons with specified institutional affiliations
    a. Universities
        (1) Science education
        (2) Engineering
        (3) Science
    b. Professional schools (e.g., medical school)
    c. Informal education agencies (e.g., museum)
    d. State education agency
    e. Local school district
4. Persons acknowledged as exemplary practitioners (e.g., SESE or Presidential awardees)

T. What followup will be done during implementation?

1. That specified by funding agency
2. Provide support
    a. Technical
    b. Material

        - c. Psychological
    - 3. On site evaluation and feedback

IV. EVALUATION

- A. What criteria should be used for "forward looking" evaluation of inservice?
    - 1. Worth
        - a. Educational theory
        - b. Morally acceptable
        - c. Based on evidence
    - 2. Merit
        - a. Consistent with teacher's plans and values
        - b. Provides participants variety for use
        - c. Has positive incentives
        - d. Provides systematic clinical support
    - 3. Success
        - a. Objectives are public and clear
        - b. Instructor is competent, uses androgogy
        - c. Accounts for diagnosed needs
        - d. Applicable to classroom
        - e. Sufficient time is provided to learn, practice, master, and apply content
- B. What criteria should be used for "backward looking" evaluation of delivery and implementation?
    - 1. Content was informative
    - 2. Content was useful to participants
    - 3. Presenter was effective
    - 4. Participants exhibit behavior changes during activities commensurate with objectives

5. Participants exhibit behavior changes in own classroom

C. What instruments could be used to collect data for a "backward looking" evaluation?

1. Questionnaires
2. Rating scales
3. Personal interviews
4. Classroom observations
5. Video-tapes
6. Audio-tapes
7. Teacher products
    a. Unit and/or lesson plans developed as a result of participation in a curriculum writing inservice
8. Pre and post-tests of participants' achievement, attitudes, process skills, analytical skills, creativity
9. Hands on laboratory practicum
10. Two or more of the above as multiple data sources

D. What influences decisions regarding instruments and types of data collected?

1. Funding
2. Time
3. Geographic location of participants
4. Personnel available to collect and analyze data
5. Level of professional expertise available

Chapter 8

RESPONSE TO THE "GUIDE TO IN-SERVICE SCIENCE TEACHER EDUCATION: RESEARCH INTO PRACTICE"

Emma Walton

Science supervisors, whether they are at the building level as department chairs, at the district level or in the state department of education, are very often responsible for planning and implementing inservice and/or staff development activities. Their resources vary from a structured department of staff development to a delegated "Well, we need to have an inservice -- would you find something interesting?" Funding may or may not be forth coming. Even with the diverse situations, there are common elements in developing inservice activities and this guide can be of great assistance to a planner.

The purpose of this guide is to build a foundation for individuals who are faced with making decisions regarding the improvement of science education through staff development. It is strongly recommended that this guide be within easy reach of the decision makers.

The research chapter provides a solid background and raises questions which will need to be addressed by the user. These issues, such as voluntary participation versus mandated participation have no easy nor right answers and will vary from situation to situation.

The chapter dedicated to "Meeting Teachers' Needs" provides the decision maker with data which indicate that in the United States, there is inadequate assessment of needs which leads to inservice efforts that are not as effective as they could be if they were addressing the needs of teachers' programs. The chapter vividly points out that school systems ignore the immense value of teacher participation in professional organizations meetings and conferences. If attitudes towards this kind of involvement could be changed, a tremendous gain towards professionalism would be achieved.

"A Paradigm For Staff Development Planning" gives a synthesis of several models of inservice which is useful in assisting organizations in their development of a staff development system. As the chapter states, "by applying the paradigm, efficacious inservice programs will evolve as a science -- not simply as chance events." Collaborative procedures from which a science supervisor could benefit when called upon to initiate inservice are described in "Structures for Delivery of Inservice Program Models." Probably the most significant statement made by Kyle and Seoddi is that "the evaluation of staff development must be viewed as a process, not an event." It is readily admitted that the evaluation of staff development is not a well developed area.

However the chapter does give perspective, trends, and ways to develop an evaluation process. Baden's (1982) six step evaluation model can be the starting point for an individual who is in the planning stage of of staff development programs. The framework in "A Planner's Guide to Inservice" can save a science supervisor considerable time as he/she plans and implements an inservice program. It provides an efficient systematized approach to creating an action plan tailored to one's own situation.

Suggestions for the Science Supervisor: A Sample Action Plan

As with any undertaking, clear goals and objectives make the task easier than just starting with a vague idea of what you want to accomplish. (See Attachment I) The following is an outline of a sample of a planning process for inservices of a district in which the inservice work is school based:

Early April	State released time planning is to begin for the following year
Mid-April	Principals identify inservice team (administrator(s) plus 3-7 teachers)
Late April	Team conducts needs assessment of staff (see Attachment II)
Early May	Teams will share information with staff members, organize action-planning groups to develop topics and identify presenters and resources
Late May	Complete state release time plans

A critical task is to identify and confirm the top presenters available. Support to accomplish this can be obtained through the following methods:

A. Draw on the expertise within your staff

Within your own staff, there may be individuals who can zero in on the needs of teachers. There may need to be time arranged for the presenter to develop the inservice program. If there is not money for release of the teacher, then the principal or other teachers might be willing to plan an activity for the class to make planning time possible for the presenter.

Another individual who many times has strong abilities to lead inservice programs is the principal. Sometimes it only takes asking him or her.

B. Draw on expertise within the district

Sharing talents within a district makes the district stronger. A cooperative arrangement might be worked out so that inservice presenters can be in a "talent bank."

C. Draw on community resources

Presenters or agencies from the community can be identified to assist in delivery of training. Many organizations are eager to help in this manner.

D. Work with the universities and colleges

They have expertise and talents which can complement what schools or school systems are trying to do. They have a vested interest in that the better the schools are, the more potential there is for students to go to their institutions. They also gain visability and can help to mold strategies and change what content the teachers are being exposed to in the workshops.

E. Work with neighboring districts

If a presenter is identified as being outstanding but, because of cost of travel or cost of the honorarium, a school or a district can not find the resources, sharing may make it possible to arrange for the presenter.

F. The professional organizations

The National Science Supervisors Association (NSSA), the Association for the Education of Teachers in Science (AETS) and the National Science Teachers Association (NSTA) are all outstanding in their identification of respected presenters. A cooperative agreement might be made to have more than one organization help sponsor a presenter -- especially if a local science education association would be the main sponsor.

G. Textbook and science equipment companies

Many of the series of texts have outstanding authors and companies are most helpful in sponsoring them to work with teachers. One thing to be attuned to if you are thinking about having a company sponsor a presenter is to make sure that the objectives of the inservice are yours and that they are followed. This is just a word of caution.

H. Federal and state funded projects

Federal and state funded projects many times have funds to disseminate their information. The professional journals can be a source of information as to the kinds of activities that are happening. The NASA activities many times can be coordinated so as to complement the goals of inservice activities.

After the goals and objectives have consensus, and the presenters and the resources are decided upon, a timeline should be developed, and task assignments made. Information should be sent to those who need it, checklists developed, rooms reserved, snacks ordered, and evaluation forms should either be developed or ordered. Appendix III is composed of samples of various forms that could be used.

When the inservice day actually arrives, the ideal situation to find yourself in is for everything to be done and for there to be nothing to do except greet the participants. Of course we all know that doesn't happen completely. However if adequate planning has occurred, the inservice will be relatively relaxed. The most important ingredient to have in an inservice is conveying the pleasure of having the participants share the day. Warmth, caring and enthusiasm are of top importance. Inservice presenters and administrators should be advocates of their programs. Make people feel good about learning.

An evaluation should be done during the last part of the inservice. Adequate forms and pencils should be available so that participants will feel the evaluation is valued.

After It Is Over -- What Next

Put your feet up, relax and enjoy the success -- for a time. Then analyze how the inservice "felt", analyze the evaluation forms and make notes on how to improve the next time. Encourage informal comments and feedback about the inservice. Always be looking at what should be done next time.

Send "thank you's" to the presenters and publicly recognize both the presenters and participants. This adds emphasis on staff development and when educators perceive that inservice is valued, then the tasks become easier and easier.

Staff development is vital to the growth of educational systems and we must give it the attention that it needs. It cannot be an afterthought. Careful planning and implementation are critical and science education has much to gain from inservice programs.

Attachment 8-1.

STATE RELEASED TIME PLANNING FOR SCHOOL BASED IN-SERVICE

State Released Time Planning completed by the Instructional Leader and their In-Service Team will be able to accomplish the following goals:

1. To involve staff in collaborative goal-setting to determine the school goal.
2. To identify in-service topics which will support the school goal.
3. To develop in-service plans and identify resource persons to deliver training.
4. To facilitate and evaluate state released time training.

GOAL I: To involve staff in collaborative goal-setting to determine the school goal.

MAJOR OBJECTIVE:	ACTIVITY:	TIMELINE:	RESP. AGENT:
A. The Instructional Leader will establish an in-service team.	A. Three to eight staff members will be selected to make-up the in-service team. (Volunteers, Dept. Chairpersons, etc.)	Early April	Instructiona Leader
B. Prepare data for entire faculty review, (Board goals, profile informattion, district reports.)	B. In-service team members and leader will collect information and share with staff. (Whole staff, within department meetings or cross-department meetings).	Early April	In-service Team and Leader
C. Determine the school instructional improvement goal using needs assessment/goal setting.	C. Using the collaborative goal-setting process bring staff to consensus on a school instructional improvement goal.	Mid-April	In-Service Team and Leader
D. Share established goal with entire staff and/or needs assessment results.	D. Distribute copies to all staff, post in lounge, etc.	Mid-April	In-Service Team

GOAL II: To identify in-service topics which support the school goal.

MAJOR OBJECTIVE:	ACTIVITY:	TIMELINE:	RESP. AGENT:
A. Identify in-service topics for state released time days.	A. Identify topics which support the accomplishment of the school goal for: August 29, 1986 October 13, 1986 January 19, 1987 April 17, 1987	Mid-April	In-Service Team
B. Complete in-service topic sheet.	B. List selected topics on in-service topic sheet.	May 15, 1986	Instructional Leader

---

GOAL III: To develop in-service plans and confirm resource persons to deliver training.

MAJOR OBJECTIVE:	ACTIVITY:	TIMELINE:	RESP. AGENT
A. To complete state released time plans: August 29, 1986 October 13, 1986 January 19, 1987 April 17, 1987	A. Develop objectives and activities to match your topic and school goal for each state released time day. (Many sample plans with objectives and activities can be found in this document. Please, feel free to adapt or adopt any that are appropriate. You may also develop your own.)	Late-April	In-Service Team and Leader
B. To confirm resource people to deliver training for each state released time day.	B. Contact presenters and confirm their commitment to deliver training. (The Talent Bank Catalogue identifies people and their expertise. Check within your staff too.)	Early-May	In-Service Team and Leader
C. To submit state released time plans.	C. Complete a topic sheet and a state released time plan sheet for each of the four in-service days. (One topic sheet for the year and one set of plans for each in-service.)	May 15, 1986	In-Service Team and Leader
	Send to Staff Development Office 217 Benson (Keep a copy of the plans for your unit.)	May 23, 1986	Instructiona Leader

GOAL IV: To facilitate and monitor State Released Time Training.

MAJOR OBJECTIVE:	ACTIVITY:	TIMELINE:	RESP. AGENT
A. To provide successful in-service on State Released Time Days.	A. Preparation and follow-up:		
	1. Reconfirm presenter.	3 weeks before each training	Leader or Team Member
	2. Arrange for reproduction of any materials.	2 weeks before	Team Member
	3. Review with staff how up-coming training supports the school goal.	2 weeks before	Leader or Team Member
	4. Prepare agenda and share with staff.	1 week before	Leader
	5. Introduce Presenter and reinforce how training compliments established school goals.	State Released Time Day	Leader o Team Member
	6. Evaluate training. (Anchorage School District computerized evaluation forms will be sent to you prior to the training day.) Review comments from staff.	State Released Time Day	Team Member
	7. Send completed evaluation forms to Staff Development.	Within a week after each training day.	Leader or Team Member
	8. Follow-up training with additional information and/or observations to confirm if implementation is taking place.	1 week after	Team Member

Attachment 8-2.

SAMPLES
OF
NEED ASSESSMENT
INSTRUMENTS

DATE: ____________________
DEPARTMENT: ____________________
NAME (OPTIONAL): ____________

ASSESSMENT OF FACULTY IN-SERVICE NEEDS

Next year, we will again have the opportunity of using four state-released time days (August 29, October 13, January 19, and April 17) for addressing unit and department concerns. We would like to do a better job of getting your input on how to use those days and of involving you in the planning process for dealing with a number of staff development needs.

1. In order to improve the competencies of students in subject area(s) in which you teach, how would you rate the following--(check one for each item--1 for "most important"; 2 for "very important"; 3 for "important"; 4 for "somewhat important"; and 5 for "least or not important").

	1	2	3	4	5
a. Time to work with department on the sequence of instruction.	___	___	___	___	___
b. Time to work with department on developing competency tests and/or evaluation instruments for courses.	___	___	___	___	___
c. Opportunity to learn how to improve the student evaluation measures I use.	___	___	___	___	___
d. Opportunity to learn how to develop and use useful instructional objectives.	___	___	___	___	___
e. Time to work on my own lesson planning preparation.	___	___	___	___	___
f. Opportunity to learn about new teaching methods appropriate to my field.	___	___	___	___	___
g. Opportunity to learn how to do a preliminary assessment of students (diagnostic testing).	___	___	___	___	___
h. Time to work with department on reviewing and evaluating books and materials.	___	___	___	___	___
i. Opportunity to develop unit goals.	___	___	___	___	___
j. Opportunity to develop department goals.	___	___	___	___	___
k. Time to develop individual goals.	___	___	___	___	___
l. Opportunity to work with department on curriculum development.	___	___	___	___	___
m. Opportunity to work with department on course objectives.	___	___	___	___	___
n. Opportunity to work with department on developing course syllabi.	___	___	___	___	___
o. Other (please list)					
________________________________					
________________________________	___	___	___	___	___

Assessment of Faculty In-Service Needs (continued)

2. How would you like to use the four days of in-service next year if we are to meet our goal of improving student achievement? Rate the following as to the degree you feel they will be most beneficial to you in meeting this goal: (Put a "1" next to the item which would be the highest priority for you, a "2" next to the item with the second highest priority, and so on). In all cases, the program will be planned and carried out jointly by administrators and faculty representatives.

   a. Unit/department in-service on sequencing of instruction. ____

   b. Unit/department in-service on competency testing. ____

   c. Unit/department in-service on new instructional methods. ____

   d. Unit/department in-service on teacher-made tests. ____

   e. Unit/department in-service on instructional objectives. ____

   f. Unit/department in-service on developing course syllabi and selection of appropriate course materials. ____

3. What other types of in-service would you like to have that deals with the goal of improving student achievement?

4. Of the areas of in-service listed in numbers 2 and 3 above, which ones do you think need to be given in more than one year?

5. Credit courses are a way of getting information to you and at the same time help you in recertification requirements. What credit courses would you like to see offered next year?

Assessment of Faculty In-Service Needs (continued)

6. Continued in-service includes a number of different vehicles for sharing information. Please rate the following as to their appropriateness and as to the availability of your own time. (Put a "1" next to the item with the highest priority, a "2" for the items with the second highest priority, and so on).

    a. In-service during state-released time days. ____

    b. In-service during conference periods. ____

    c. In-service during afternoon faculty meetings. ____

    d. In-service during afternoon department meetings. ____

    e. Use of substitute time for in-service. ____

Thank you for helping us.

STAFF NEEDS ASSESSMENT FOR PLANNING IN-SERVICE

In terms of in-service:

1. What do we do well?

2. What do we do that is satisfactory but which needs improvement?

3. What are we doing now that we really ought to stop?

4. What are we not doing that we really should do?

5. What topics would you like to see addressed during next year's in-service?

State Released Time In-Service Plans

UNIT: Secondary

SUBJECT AREA: Science

PRESENTERS:

DATE OF IN-SERVICE:

TOPIC: Safety and Science

HALF DAY: FULL DAY:

SPECIALIST'S SIGNATURE:

OBJECTIVES	ACTIVITIES	EVALUATION
By the conclusion of the workshop, participants will: 1. Have an increased awareness of safety in the Science Classroom. 2. Have an increased awareness of the latest safety information.	1. Lecture, films, slides and and overhead presentation on hazards in a science classroom. 2. Presentation of updates on Hazardous chemicals, the proper storage and safe disposal of chemicals. 3. Presentation on the "Right-To-Know" law.	1. Completed Anchorage School District evaluation form.

Copies: Alaska State Department of Education, Staff Development Office, Curriculum Specialists, Unit Submitting Plans

State Released Time In-Service Plans

UNIT: Elementary

DATE OF IN-SERVICE:

HALF DAY: FULL DAY: X

SUBJECT AREA: Science (Interdiciplinary)

TOPIC: Marine Education & Sea Week

SPECIALIST'S SIGNATURE:

PRESENTERS:

OBJECTIVES	ACTIVITIES	EVALUATION
To prepare teaching staff to conduct activities during and after Sea Week with emphasis on interdisciplinary approach to our marine environment. To help plan Sea Week activities. Be familiar with materials available for teaching Sea Week curriculum.	1. Overview of Sea Week. 2. Develop activities for use during Sea Week. 3. Develop a list of possible field trips to enhance Sea Week.	1. Teachers will complete the districtwide evaluation form. 2. Teachers will follow thorough on the k-6 curriculum during Sea Week as developed by the Alaska Sea Grant Program. 3. Student and parent involvement in the program will be evaluated. 4. Listing of the field trips related to Sea Week.

RETURN TO STAFF DEVELOPMENT-Alaska State Department of Education

State Released Time In-Service Plans

Elementary, (Secondary)

UNIT: Curriculum Development

DATE OF IN-SERVICE: ________

HALF DAY: ____ FULL DAY: ________

SUBJECT AREA: Science

TOPIC: Reading, Writing, and Science

SPECIALIST'S SIGNATURE: ________

PRESENTERS: ________

OBJECTIVES	ACTIVITIES	EVALUATION
By the conclusion of this workshop, each participant will: 1. Have an increased awareness of how science can be used to develop reading and writing skills. 2. Be able to develop plans for teaching students in an intergrated way.	1. Work with science concepts and develop the strategies for teaching writing and reading using the science concepts as a basis. 2. Develop a list of resources to assist in the development of the intergrated approach in teaching.	1. The completed in-service evaluation form. 2. A written plan for science for their classroom. 3. A written list of resources.

RETURN TO STAFF DEVELOPMENT-Alaska State Department of Education

PRE-CHECK

1) BRING INSERVICE PACKET TO SCHOOL.

2) POST A MAP OF THE SCHOOL. POST SIMPLE DIRECTIONS.

3) CHECK ON COFFEE AND ASSIST IF NEEDED.

4) CONFER WITH PRINCIPAL ON BELL SCHEDULE. LEAVE A WRITTEN SCHEDULE.

5) PUT DESK AND CHAIR AT DOOR FOR LATE COMERS. LEAVE A SIGN WITH DIRECTIONS TO TAKE AN ITINERARY.

6) DETERMINE STRATEGIC AREAS TO STAND AND GREET TEACHERS. IS THERE MORE THAN ONE ENTRANCE THAT COULD BE CONSIDERED THE MAIN DOOR?

7) PARKING DIRECTOR. CHECK WITH PRINCIPAL ON ALTERNATIVE PARKING.

8) LEADER. GET VOLUNTEERS AT LUNCHEON.
REMIND VOLUNTEERS AT LUNCHEON.
EXTRA EVALUATIONS.

EVERYBODY- UPON YOUR ARRIVAL PUT A SIGN ON THE DOOR, GIVING SESSION NAME AND ROOM NUMBER.

EVERYBODY- KNOW TEAM LEADERS ROOM NUMBER.

CHECKLIST

- ANNOUNCE SESSION NAME AND ROOM NUMBER. HAVE TEACHERS CHECK TO SEE THAT THEY ARE IN THE CORRECT SESSION.
- DURING THE FIRST SESSION HAND OUT LITERATURE CORRELATIONS HANDBOOK.
- EMPHASIZE TEACHING ONE KIT PER QUARTER. HELPS WITH BACKLOG, AND GIVES THE STUDENTS CONSISTENCY.
- 42 COPIES OF EACH KIT IS OUR EVENTUAL GOAL, WHICH WILL HELP MAKE IT EASIER TO GET KITS ON PREFERRED DATES.
- NEW KITS WILL REPLACE OLD AS AVAILABLE. ORDER BRAND NEW KITS ONLY AFTER RECEIVING NOTIFICATION THAT THEY ARE AVAILABLE.
- SOME TEACHERS FEEL THAY NEED MORE OF A SCIENCE BACKGROUND. ASSURE THEM THEY WILL DO FINE AS THEY ARE! ANSWERS TO HARD QUESTIONS OR FURTHER STUDY OF A TOPIC CAN BE CLASS RESEARCH PROJECTS.
- SOME PEOPLE WILL WANT TWO DAYS TO COMPLETE A LESSON. IT IS OKAY! NEW KITS WILL BE FOR 30 DAYS, GIVING MORE TIME.
- EVALUATION OF STUDENT LEARNING CAN BE DONE SEVERAL WAYS. (CHECKLIST OF OBSERVABLE SKILLS, DISCUSSION, FOLDERS.)
- BE SURE TO TAKE NOTE AT THE BEGINNING OF EACH LESSON THE SCIENTIFIC SKILLS BEING USED IN THAT LESSON. LESSONS AND DISCUSSION CAN BE DIRECTED ACCORDINGLY. DISCUSS THESE SKILLS WITH THE STUDENTS.
- KITS ARE CORRELATED TO TEXT WHERE POSSIBLE, SO THEY CAN BE SUPPLELMENTED WITH ADDITIONAL CONTENT.
- KIT PARTS ARE EXPENSIVE!!!!! TEACHERS ARE RESPONSIBLE FOR KEEPING TRACK OF KIT ITEMS. (HAND LENSES, MAGNETS.)
- KITS NEED TO BE RETURNED TO THE SCIENCE CENTER CLEAN AND IN GOOD ORDER. USE STUDENTS TO HELP..
- LAST SESSION DO EVALUATIONS.

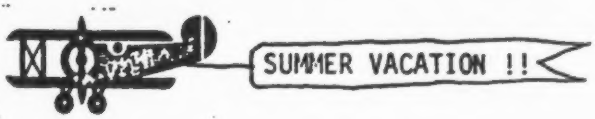
TIMELINE FOR IN-SERVICE PREPARATION

MAY 1986

12 initial contact with presenters	13	14 initial contact with principals for buildings	15	16
19	20	21 STE's have a complete list of presenters	22 Coordinator has list of buildings for in-service	23
26 Memorial Day	27	28 Notice to all principals of time, buildings, topics and presenters.	29	30

JUNE 1986

2 reminder letters typed for each presenter-hold & mail in August	3 prepare handouts to be used at the in-service	4 ALL 20 CURRICULUM GUIDES AT THE PRINT SHOP


SUMMER VACATION !!

AUGUST 1986

11	12 Print Shop sends word that all curriculum is ready	13 reminder letters mailed to each presenter	14 Curriculum guides shipped to Science Center	15
18 Science Teacher Experts return-inventory matl for in-service	19 prepare information packet for presenters 1 to 2 pages max	20 check all kits, arrange for truck delivery	21	22 luncheon for all presenters
25 am Group A meet in Rm 103 work independently. STE facilitate pm. Group B meet in Rm 101 work independently. STE facilitate	26 STE divide Group C for individual one hour meetings, then indep work	27 distribute all in-service materials to schools	28 last minute panic and opportunity to regain composure	29 IN-SERVICE DAY

Schedule for Science In-Service August 28th

12:45 Teachers arrive at designated schools. Presenters meet teachers at the main door of the building and present each with a packet outlining the rooms and times of presentations. Handouts would be numbered 1 through 8 and as the materials are given to the teachers, group assignments would be done automaticall

1:00 First Session Begins (40 minutes)

Presenters outline objectives of the sectional, pass sign-in sheet
-distribute lesson guides for brown binders
-brief overview of kit by presenter calling attention to exciting, difficult or, in some way, unusual lessons
-break into groups of two or three to be able to complete the statement "two good things about this lesson were ____________________and ____________________ but the most important part was______________________.

-question and answer session
-group sharing of teaching tips
-closure by presenter

1:40 First session Ends

5 minute break for teachers to change rooms

1:45 Second session begins using the same format at above (40 minutes)

2:25 Second session ends

10 minute break for teachers to change rooms

2:35 Third session begins

3:15 Third session ends
5 minute break for teachers to change rooms

3:20 Fourth session begins

4:00 Fourth session ends. This presenter distributes and is responsible for collecting evaluations.

NCS Trans-Optic MP18 71006-3 A1407

ANCHORAGE SCHOOL DISTRICT IN-SERVICE EVALUATION

Title of Workshop ______________________ **Date** ____/____

Location of In-Service (Bldg./Room #) ______________________

Your School and DEPARTMENT ______________________

EXAMPLES

WRONG ○✓○○○○ WRONG ○○○○⊙○

WRONG ○○○⊗○○ RIGHT ○○●○○○

INSTRUCTIONS

1. Use No. 2 pencil
2. Do NOT use a pen
3. Erase completely
4. Make no stray marks

DO NOT WRITE IN THIS AREA

⓪①②③④⑤⑥⑦⑧⑨
⓪①②③④⑤⑥⑦⑧⑨
⓪①②③④⑤⑥⑦⑧⑨
⓪①②③④⑤⑥⑦⑧⑨
⓪①②③④⑤⑥⑦⑧⑨

I. HOW WOULD YOU RATE THIS WORKSHOP IN THE FOLLOWING AREAS? (MARK ONE RATING FOR EACH STATEMENT.)

		Best		Average		Worst	
A. Objectives were made clear	Very Clear	○	○	○	○	○	Not Clear
B. Objectives were met	To a Great Extent	○	○	○	○	○	Not at All
C. Ideas were of practical value	Great Value	○	○	○	○	○	No Value
D. Hand-outs/materials were relevant to my present needs	Most Relevant	○	○	○	○	○	Not Relevant
E. Presentation was effective	Highly Effective	○	○	○	○	○	Not Effective

II. MARK ONE OF THE FOLLOWING RATINGS WHICH BEST DESCRIBES YOUR FEELINGS ABOUT THIS WORKSHOP IN COMPARISON TO OTHERS YOU HAVE ATTENDED.

ONE OF THE BEST	BETTER THAN MOST	ABOUT AVERAGE	WEAKER THAN MOST	ONE OF THE WORST
○	○	○	○	○

III. WHAT ADDITIONAL HELP WOULD YOU LIKE IN THIS AREA? (MARK AS MANY AS NECESSARY)

ANOTHER WORKSHOP - ○	CREDIT COURSE - ○	ADDITIONAL MATERIALS - ○

IV. WHAT WERE THE STRONGEST FEATURES OF THIS WORKSHOP?

V. WHAT WERE THE WEAKEST FEATURES OF THIS WORKSHOP?

VI. IN WHAT WAYS MIGHT YOU USE THE INFORMATION/MATERIALS YOU HAVE RECEIVED?

VII. ANY ADDITIONAL COMMENTS?

COMMENTS MAY BE CONTINUED ON BACK, BUT ONLY IN SHADED AREAS.

PLEASE WRITE ONLY IN SHADED AREAS IF CONTINUING COMMENTS

WRITE IN SHADED AREAS ONLY!